



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

FCC Rules and Regulations / Intentional Radiators

Low Power Auxiliary Stations

Part 74, Subpart H, Sections 74.801 - 74.882

Part 74.861 (d) Other than TV Broadcasting

THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION

Formal Name: PSM200 TransMixer

Kind of Equipment: Wireless Personal Monitor Transmitter

Test Configuration: Through shielded audio frequency cables (Tested at 120 vac, 60 Hz)

Model Number(s): P2T-X1

Model(s) Tested: P2T-X1

Serial Number(s): #2, #3 & #4

Emission Designator: 73.8KF3E

Date of Tests: December 17, 18 & 19, 2007

Test Conducted For: Shure Inc.  
5800 Touhy Ave  
Niles, IL 60714

**NOTICE:** "This report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government". Please see the "Additional Description of Equipment Under Test" page listed inside of this report.

© Copyright 1983-2007 D.L.S. Electronic Systems, Inc

**COPYRIGHT NOTICE**

This report or any portion thereof, may not be reproduced or modified in any form without the expressed written consent of D.L.S. Electronic Systems, Inc.



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

## SIGNATURE PAGE

Report By:

Arnorn C. Rowe  
Test Engineer  
EMC-001375-NE

Reviewed By:

William Stumpf  
OATS Manager

Approved By:

Brian Mattson  
General Manager



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## TABLE OF CONTENTS

|      |                                                           |    |
|------|-----------------------------------------------------------|----|
| i.   | Cover Page .....                                          | 1  |
| ii.  | Signature Page .....                                      | 2  |
| iii. | Table of Contents .....                                   | 3  |
| iv.  | NVLAP Certificate of Accreditation .....                  | 5  |
| 1.0  | Summary of Test Report .....                              | 6  |
| 2.0  | Introduction .....                                        | 6  |
| 3.0  | Object .....                                              | 6  |
| 4.0  | Test Set-Up .....                                         | 7  |
| 5.0  | Test Equipment .....                                      | 8  |
| 6.0  | Ambient Measurements .....                                | 9  |
| 7.0  | AC Power Line Conducted Emission Measurements .....       | 10 |
| 8.0  | Description of Test Sample .....                          | 11 |
| 9.0  | Additional Description of Test Sample .....               | 12 |
| 10.0 | Photo Information and Test Set-Up .....                   | 12 |
| 11.0 | Radiated Photos Taken During Testing .....                | 13 |
| 11.0 | AC Power Line Conducted Photos Taken During Testing ..... | 15 |
| 12.0 | Results of Tests .....                                    | 17 |
| 13.0 | Conclusion .....                                          | 17 |
|      | TABLE 1 – EQUIPMENT LIST .....                            | 18 |



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## TABLE OF CONTENTS

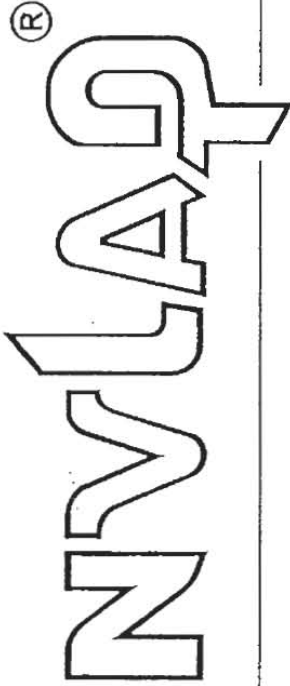
|                                                                                       |    |
|---------------------------------------------------------------------------------------|----|
| Appendix A – Transmitter Emissions Tests .....                                        | 19 |
| 1.0 Test Set-Up .....                                                                 | 20 |
| 2.0 DC Voltages and Current into final Amplifying Stage.....                          | 20 |
| 3.0 RF Power Output .....                                                             | 20 |
| 3.0 Data taken of the RF Power Output.....                                            | 21 |
| 3.0 RF Output Power Photos Taken During Testing .....                                 | 24 |
| 4.0 Modulation Characteristics .....                                                  | 25 |
| 4.0 Graph(s) taken of the Modulation Characteristics .....                            | 26 |
| 5.0 Occupied Bandwidth.....                                                           | 29 |
| 5.0 Data and Graph(s) taken of the 99% Occupied Bandwidth.....                        | 30 |
| 6.0 Spurious Emissions At Antenna Terminals .....                                     | 33 |
| 7.0 Field Strength of Spurious Emission Measurements .....                            | 34 |
| 7.0 Radiated Data and Graph(s) Taken During Testing for Fundamental Emissions .....   | 35 |
| 7.0 Radiated Data and Graph(s) Taken During Testing for Spurious Emissions .....      | 37 |
| 8.0 Frequency Stability (Temperature).....                                            | 40 |
| 9.0 Frequency Stability (Voltage Variation).....                                      | 40 |
| 8.0 & 9.0 Low Channel Band Edge Data Taken for Temperature & Voltage Variation.....   | 41 |
| 8.0 & 9.0 High Channel Band Edge Data Taken for Temperature & Voltage Variation ..... | 53 |
| 10.0 Data Taken for Frequency Tolerance .....                                         | 65 |
| 11.0 Frequency Stability Photos Taken During Testing .....                            | 67 |
| 12.0 Intermodulation Data and Graph(s) Taken During Testing.....                      | 68 |
| 13.0 Intermodulation Photos Taken During Testing.....                                 | 75 |



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

United States Department of Commerce  
National Institute of Standards and Technology



## Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 100276-0

**D.L.S. Electronic Systems, Inc.**  
Wheeling, IL

is accredited by the National Voluntary Laboratory Accreditation Program for specific services,  
listed on the Scope of Accreditation, for:

### ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.  
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 18 June 2005).



2007-10-01 through 2008-09-30

Effective dates

*Dolly S. Buser*  
For the National Institute of Standards and Technology

NVL AP-01C (REV 2006-09-13)



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## 1.0 SUMMARY OF TEST REPORT

It was found that the PSM200 TransMixer, Model Number(s) P2T-X1, **meets** the radio interference conducted and radiated emission requirements of the FCC "Rules and Regulations", Part 74, Subpart H, Section 74.861 (d), for low power auxiliary stations.

## 2.0 INTRODUCTION

On December 17, 18 & 19, 2007, a series of radio frequency interference measurements was performed on PSM200 TransMixer, Model Number(s) P2T-X1, Serial Number: #2, #3 & #4. The tests were performed according to the procedures of the FCC as stated in Part 2 - Frequency Allocations and Radio Treaty Matters: General Rules and Regulations, Subpart J, Equipment Authorization Procedures of the Code of Federal Regulations 47. Tests were performed by personnel of D.L.S. Electronic Systems, Inc. who are responsible to Donald L. Sweeney, Senior EMC Engineer.

D.L.S. Electronic Systems, Inc. is a full service EMC/Safety Testing Laboratory accredited to ISO 17025. NVLAP Certificate and Scope can be viewed at <http://www.dlsemc.com/certificate>. Our facilities are registered with the FCC, Industry Canada, and VCCI.

### **Main Test Facility:**

D.L.S. Electronic Systems, Inc.  
1250 Peterson Drive  
Wheeling, Illinois 60090

### **O.A.T.S. Test Facility:**

D.L.S. Electronic Systems, Inc.  
166 S. Carter Street  
Genoa City, Wisconsin 53128

## 3.0 OBJECT

The purpose of this series of tests was to determine if the test sample could meet the radio frequency interference requirements of the FCC "Rules and Regulations", Part 74, Subpart H, Section 74.861 (d), for low power auxiliary stations.



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

#### 4.0 TEST SET-UP

All tests were performed at D.L.S. Electronic Systems, Inc. and set up according to the FCC and TIA-603C regulations. The conducted tests if required were performed with the test item placed on a non-conductive table (table top equipment), located in the test room. Equipment normally operated on the floor was tested by placing it on the metal ground plane. The ground plane has an electrical isolation layer over its surface approximately 7mm thick. The power line supplied was connected to a dual line impedance stabilization network electrically bonded to the ground plane, located on the floor. The networks were constructed per the requirements of the American National Standards Institute, ANSI C63.4-2003.

All radiated emissions tests were performed with the test item placed on a 80 cm high rotating non-conductive table, located in the test room. Equipment normally operated on the floor was placed on a metal covered turntable, which is flush with the surrounding conducting ground plane. The ground plane has an electrical isolation layer over its surface approximately 7 mm thick. The EUT is separated from the turntable ground plane by a non-conductive layer. The equipment under test was set up according to TIA Standard, TIA-603-C:2004, Section 2.2.12.



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## 5.0 TEST EQUIPMENT (Bandwidths and Detector Function)

All preliminary data below 1000 MHz was automatically plotted using the ESI 26/ESI 40 Fixed Tuned Receiver. The data was taken using Peak, Quasi-Peak or the Average Detector Functions as required. This information was then used to determine the frequencies of maximum emissions. Above 1000 MHz, final data was taken using the Average Detector.

Below 1000 MHz, final data was taken using the ESI 26/ESI 40 fixed tuned receiver. These plots were made using the Peak or Quasi-Peak Detector functions, with manual measurements performed on the questionable frequencies using the Quasi-Peak or the Average Detector Function of the Analyzer or ESI 26/ESI 40 Receiver as required. Above 1000 MHz, final data was taken using the Average Detector on the ESI 26/ESI 40 Fixed Tuned Receiver.

The bandwidths shown below are specified by ANSI C63.4-2003.

| Frequency Range   | Bandwidth (-6 dB) |
|-------------------|-------------------|
| 10 to 150 kHz     | 200 Hz            |
| 150 kHz to 30 MHz | 9 kHz             |
| 30 MHz to 1 GHz   | 120 kHz           |
| Above 1 GHz       | 1 MHz             |

A list of the equipment used can be found in Table 1. All primary equipment was calibrated against known reference standards with a verified traceable path to NIST.



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## 6.0 AMBIENT MEASUREMENTS

For emissions measurements, broadband antennas and an EMI Test Receiver with a panoramic spectrum display are used. First the frequency range is scanned and displayed on the test receiver display. Next the scanned frequency range is divided into smaller ranges, and then it is manually tuned through to determine the emissions from the EUT. A headset or loudspeaker is connected to the test receiver's AM/FM demodulated output as an aid in detecting ambient signals and finding frequencies of significant emission from the EUT. If there is any doubt as to the source of the emission, it is further investigated by rotating the EUT, or by disconnecting the power from the EUT.

The EUT is set up in its typical configuration and operated in its various modes. For tabletop systems, cables are manipulated within the range of likely configurations. For floor-standing equipment, the cables are located in the same manner as the user would install them and no further manipulation is made. If the manner of cable installation is not known, or if it changes with each installation, cables or wires for floor-standing equipment shall be manipulated to the extent possible to produce the maximum level of emissions. For each mode of operation, the frequency spectrum is monitored. Variations in antenna height, antenna polarization, EUT azimuth, and cable or wire placement (each variable within bounds specified elsewhere) are explored to produce the emission that has the highest amplitude relative to the limit.



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## 7.0 AC POWER LINE CONDUCTED EMISSION MEASUREMENTS – Part 15.207

Conducted emissions were measured over the frequency range from 150 kHz to 30 MHz in accordance with the power line measurements as specified in FCC Part 15, Subpart C, Section 15.207 & ANSI C63.4-2003. Since the device is operated from the public utility lines, the 120 Vac, 60 Hz power leads, high (hot) and low (neutral) sides, were measured by connecting the measuring equipment to the appropriate meter terminal of the LISN. During the test, the cables were placed and items moved (when appropriate) to maximize emissions. All signals were then recorded. The allowed levels for Intentional Radiators which is designed to connected to the public utility (AC) power line cannot exceed the following:

| Frequency of Emissions (MHz) | Conducted Limits (dBuV) |          |
|------------------------------|-------------------------|----------|
|                              | Quasi Peak              | Average  |
| .15 to .5                    | 66 to 56                | 56 to 46 |
| .5 to 5                      | 56                      | 46       |
| 5 to 30                      | 60                      | 50       |

### **NOTE:**

All test measurements were made at a screen room temperature of **74°F** at **52%** relative humidity.



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

## 8.0 DESCRIPTION OF TEST SAMPLE:

### 8.1 Description:

The PSM200 system, P2T TransMixer and P2R Receiver, is a frequency-agile, in-ear monitoring system for use in a wide variety of applications. Its many features help overcome the difficulties associated with stage monitoring.

The P2T TransMixer is another breakthrough design for in-ear monitoring. It allows the user to connect two line-level or mic-level inputs directly into the transmitter. The two signals can then be mixed independently. You can connect microphones or instruments directly to the inputs, use line outputs from a mixing console. In Short, no matter what the output device, you can probably plug it into the TransMixer. The P2T-X1 operates from 944 MHz to 952 MHz, using frequency modulation. It is powered by an external linear 120VAC to 12VDC power supply.

### 8.2 PHYSICAL DIMENSIONS OF EQUIPMENT UNDER TEST

Length: 220mm Width: 140mm Height: 40mm

### 8.3 LINE FILTER USED:

N/A

### 8.4 INTERNAL CLOCK FREQUENCIES:

Switching Power Supply Frequencies:

N/A

Clock Frequencies:

4 MHz & 16 MHz

### 8.5 DESCRIPTION OF ALL CIRCUIT BOARDS:

1. Populated PCB

PN: 90F10607, Rev. 5/16/07



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

9.0 ADDITIONAL DESCRIPTION OF TEST SAMPLE:  
(See also Paragraph 8.0)

1: There were no additional descriptions noted at the time of test.

10.0 PHOTO INFORMATION AND TEST SET-UP

Item 0 PSM200 TransMixer

Model Number: P2T-X1, Serial Number: #2, #3 & #4

Item 1 Shure A.C. to D.C. Power Supply; Model P520; Serial No. 5003

Item 2 Qty. 2 - 1.4 m Shielded Audio Output Cables with Metal Connectors

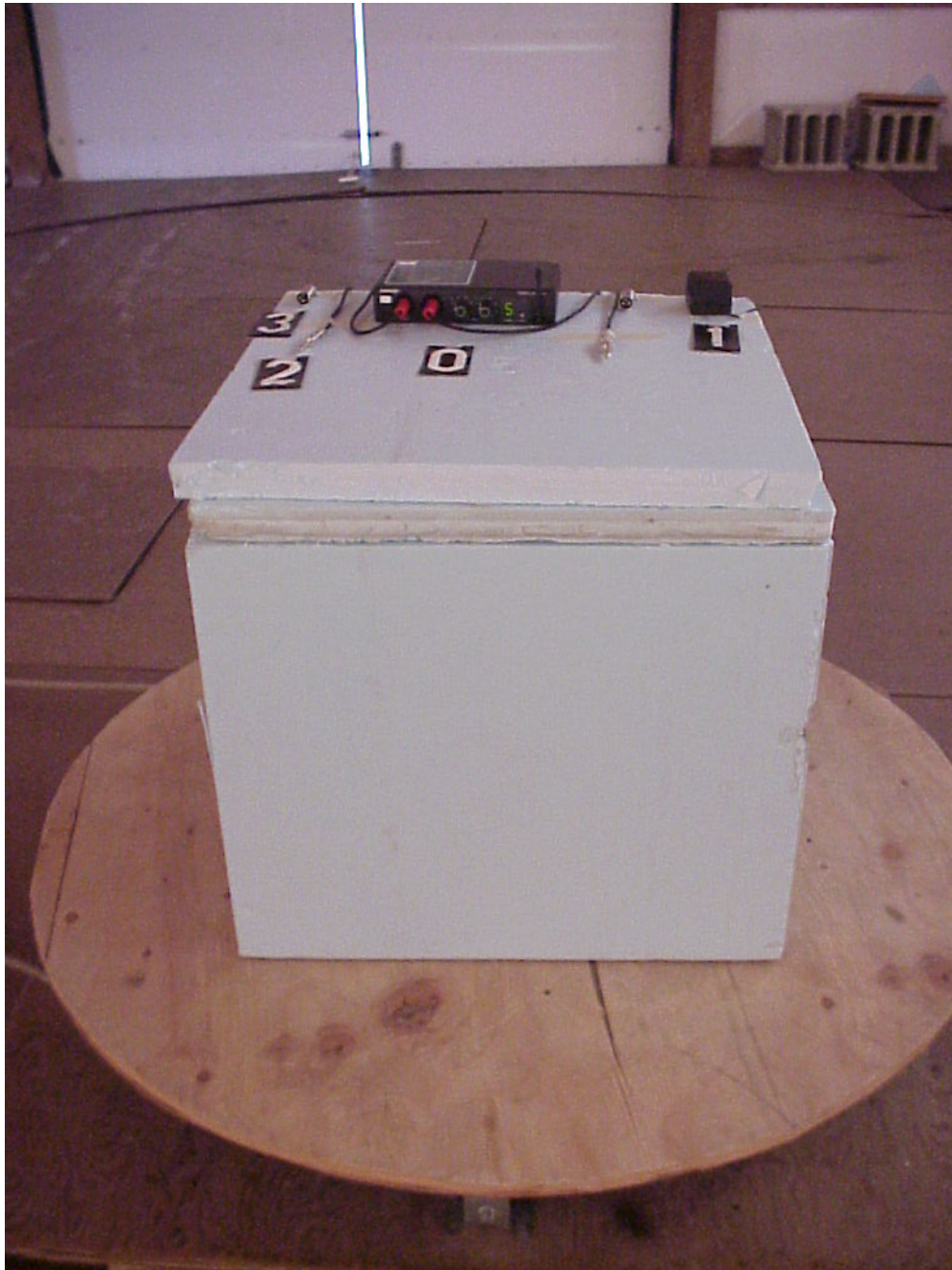
Item 3 Qty. 2 - 1.1 m Shielded Audio Input Cables with Metal Connectors



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## 11.0 RADIATED PHOTOS TAKEN DURING TESTING



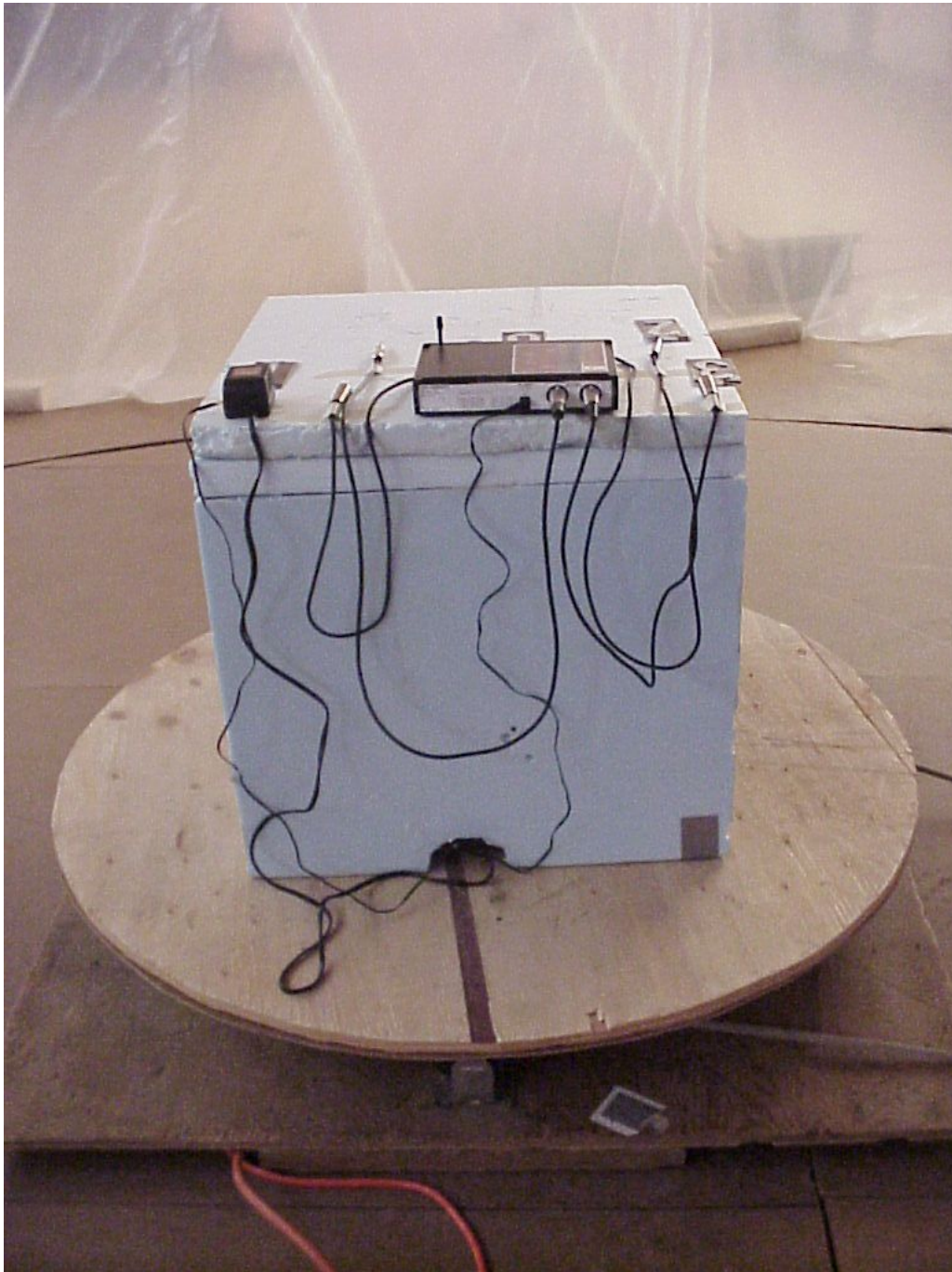
RADIATED FRONT



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## 11.0 RADIATED PHOTOS TAKEN DURING TESTING



RADIATED BACK



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## 11.0 AC POWER LINE CONDUCTED PHOTOS TAKEN DURING TESTING



LINE CONDUCTED 1



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

## 11.0 AC POWER LINE CONDUCTED PHOTOS TAKEN DURING TESTING (CON'T)



LINE CONDUCTED 2



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## 12.0 RESULTS OF TESTS

The radio interference emission charts can be seen on the pages at the end of this report. Data sheets indicating the test measurements taken during testing can also be found at the end of this report.

## 13.0 CONCLUSION

It was found that the PSM200 TransMixer, Model Number(s) P2T-X1 **meets** the radio interference conducted and radiated emission requirements of the FCC "Rules and Regulations", Part 74, Subpart H, Section 74.861 (d), for low power auxiliary stations.



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

TABLE 1 – EQUIPMENT LIST

| <b>Test Equipment</b> | <b>Manufacturer</b> | <b>Model Number</b> | <b>Serial Number</b> | <b>Frequency Range</b> | <b>Cal Due Dates</b> |
|-----------------------|---------------------|---------------------|----------------------|------------------------|----------------------|
| Receiver              | Rohde & Schwarz     | ESI 26              | 837491/010           | 20 Hz – 26 GHz         | 11/08                |
| Preamp                | Miteq               | AMF-6D-100200-50    | 313936               | 1 GHz-10 GHz           | 5/08                 |
| Antenna               | EMCO                | 3104C               | 97014785             | 20 MHz – 200 MHz       | 2/08                 |
| Antenna               | EMCO                | 3146                | 97024895             | 200 MHz – 1 GHz        | 3/08                 |
| Horn Antenna          | EMCO                | 3115                | 5731                 | 1-18 GHz               | 6/08                 |
| Function Generator    | Hewlett-Packard     | HP3312A             | 2501A18150           |                        | 8/08                 |
| Attenuator-20dB Fixed | Aeroflex Weinschel  | 75A-20-12           | 1071                 | DC – 40GHz             | 7/08                 |
| Attenuator-20dB Fixed | Aeroflex Weinschel  | 75A-20-12           | 1071                 | DC – 40GHz             | 7/09                 |
| Power Meter           | Anritsu             | ML2487A             | 6K00002069           | 100 kHz – 65 GHz       | 10/08                |
| Power Sensor          | Anritsu             | MA2490A             |                      | 50MHz-8GHz             | 10/08                |
| Filter- High-Pass     | Q-Microwave         | 100460              | 001                  | 1.1GHz                 | 5/08                 |
| Filter- High-Pass     | Mini Circuits       | NHP-600             | 438727               | 600MHz-7GHz            | 9/08                 |

All primary equipment is calibrated against known reference standards with a verified traceable path to NIST.



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

# APPENDIX A

## TEST PROCEDURE

### SUBPART H

#### LOW POWER AUXILIARY STATIONS OPERATING IN THE BANDS OTHER THAN THOSE ALLOCATED FOR TV BROADCASTING



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

## APPENDIX A

### 1.0 TEST SET-UP

All radiated emission tests were performed at D.L.S. Electronic Systems, Inc. The radiated tests were made with the test item placed on a non-conductive turntable located in the Test Room with the receive antenna placed three or one meter(s) from the device under test.

### 2.0 DC VOLTAGES AND CURRENTS APPLIED INTO FINAL AMPLIFYING STAGE – PART 2.1033(c-8)

DC source voltage is 3.61V and the current is 60.1mA

### 3.0 RF-POWER OUTPUT – PART 2.1046 and EIA /TIA-603-C:2004, SECTION 2.2.17

As stated in PART 74.861 (d)(1), the RF output power should not exceed 1 watt(s). The RF output of the PSM200 TransMixer was connected to a Spectrum Analyzer through suitable attenuation. All cables, connectors, and attenuators were calibrated prior to testing. The RF output power was measured using the following test method:

#### **Actual Measurements Taken:**

14.74 dBm Measured output of the transmitter

14.74 dBm equals 0.02979 watt(s)

#### **LIMIT:**

Manufacturer's rated output power = 15 dbm  $\pm$  2 dB

#### **MARGIN:**

$1 - 0.02979 = 0.97021$  watt(s)



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

## APPENDIX A

# DATA TAKEN OF THE RF POWER OUTPUT MEASUREMENT

EIA /TIA-603-C:2004, SECTION 2.2.17

FCC Part 74.861 (d)(1) & PART 2.1046



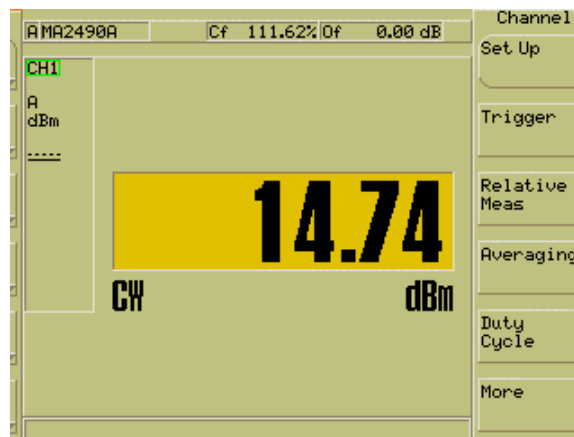
Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Peak Power Output - Conducted  
Rule part: FCC Part 74; FCC Part 2.1046  
Operator: Craig B  
Comment: Channel: 944.2 MHz

Peak Output Power = 14.74 dBm = 29.79 mW





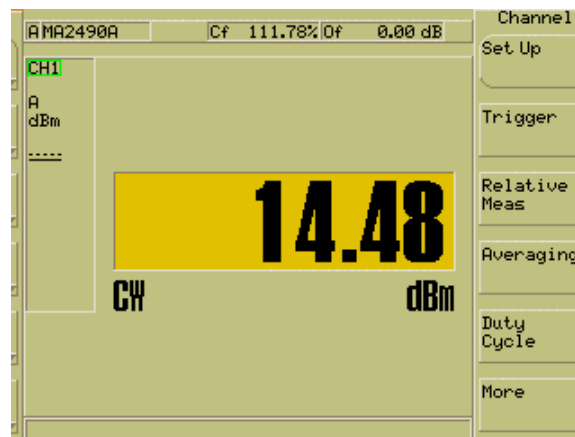
Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Peak Power Output - Conducted  
Rule part: FCC Part 74; FCC Part 2.1046  
Operator: Craig B  
Comment: Channel: 951.75 MHz

Peak Output Power = 14.48 dBm = 28.05 mW





1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

## APPENDIX A

### 3.0 RF POWER OUTPUT PHOTOS TAKEN DURING TESTING



## CONDUCTED OUTPUT POWER



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

## APPENDIX A

### 4.0 MODULATION CHARACTERISTICS – PART 2.1047 and EIA /TIA-603-C:2004, SECTION 2.2.3

#### a. Voice modulated communication equipment.

A curve showing the frequency response of the audio modulating circuit over a range of 30 Hz to 12 kHz Hz is submitted with this report.

#### b. Equipment which employs modulation limiting

A family of curves showing the percentage of modulation versus the modulation input voltage with sufficient information showing the modulation limiting capability throughout the range of modulating frequencies and input modulating signal levels employed.



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

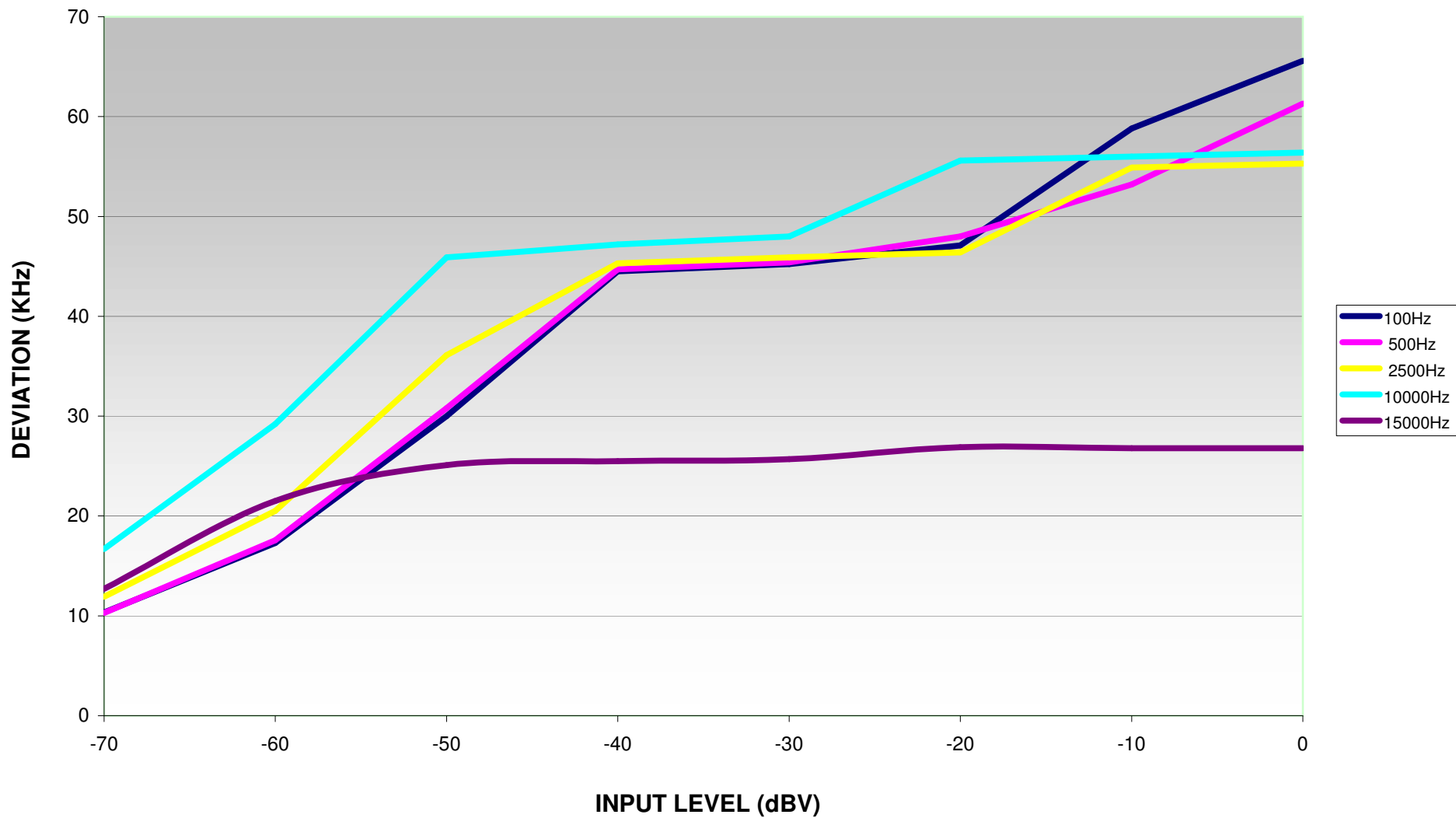
## APPENDIX A

# GRAPH(S) TAKEN SHOWING THE FREQUENCY RESPONSE OF THE AUDIO MODULATING CIRCUIT

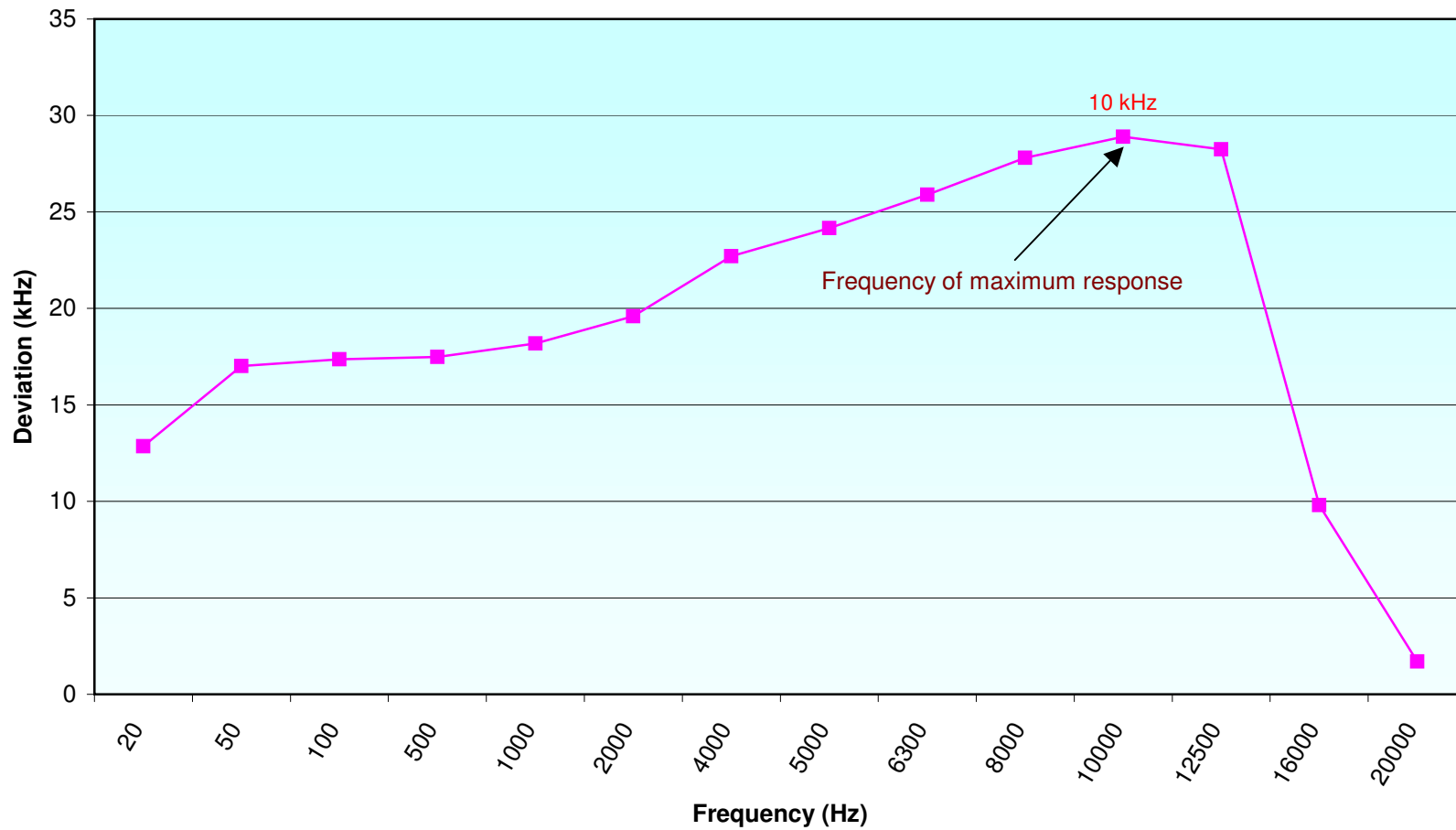
EIA /TIA-603-C:2004, SECTION 2.2.3

PART 2.1047

## PSM200 X1 DEVIATION vs. INPUT LEVEL



PSM200 X1 Deviation (kHz) for -50dBV Input





1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

## APPENDIX A

### 5.0 OCCUPIED BANDWIDTH - PART 2.1049

The occupied bandwidth is that between the lower and upper limits of the signal where the mean power is 99.0% of the total mean power and measured under the following conditions:

For low power auxiliary stations operating in the bands other than those allocated for TV broadcasting, the occupied bandwidth shall not be greater than that necessary for satisfactory transmission and emissions appearing on any discrete frequency outside the authorize band shall be attenuated  $43+10 \log^{10}$  (mean output power, in watts) dB below the mean output power of the transmitting unit (device under test).

For low power auxiliary stations operating in the bands allocated for TV broadcasting, any form of modulation may be used. A maximum of  $\pm 75$  kHz is permitted when frequency modulation is used. The operating bandwidth shall not exceed 200 kHz.

Carson's Rule:

Section 2.202 (g) Sound Broadcasting

$$B_n = 2M + 2DK, \quad K=1$$

$B_n$  = Bandwidth

$$M = 15 \text{ kHz},$$

$M$  = Maximum Modulating Frequency

$$D = 27 \text{ kHz},$$

$D$  = Peak Deviation

$$B_n = 2(15) + 2(27)(1) = 84 \text{ kHz}$$



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

## APPENDIX A

DATA AND GRAPH(S) TAKEN OF THE

99% OCCUPIED BANDWIDTH

Part 74.861 (d)(3) & PART 2.1049



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

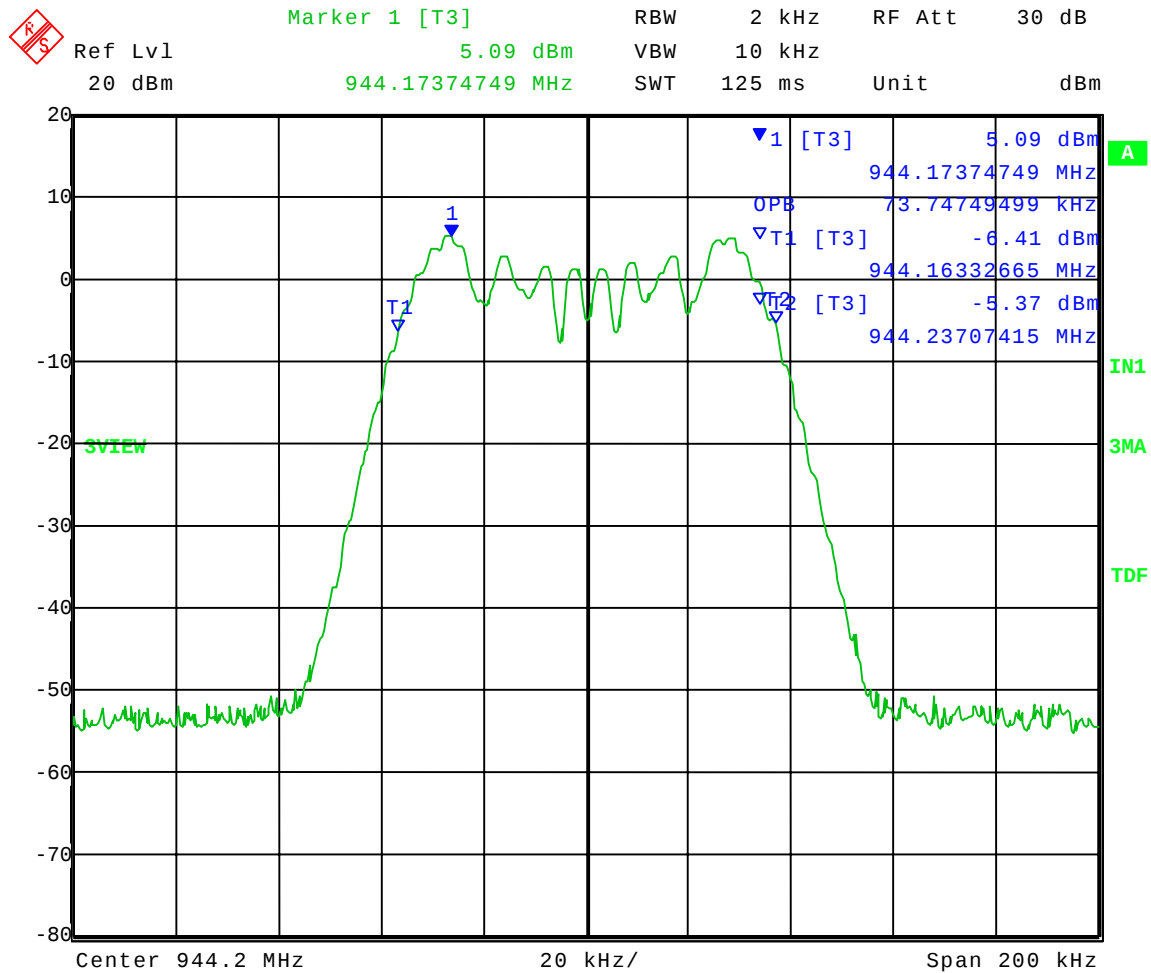
1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Occupied Bandwidth; 99% bandwidth  
Rule part: FCC Part 74; FCC Part 2.1049  
Operator: Craig B

Frequency: 944.2 MHz

99% power bandwidth = 73.75 kHz



Date: 18.DEC.2007 11:25:27



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

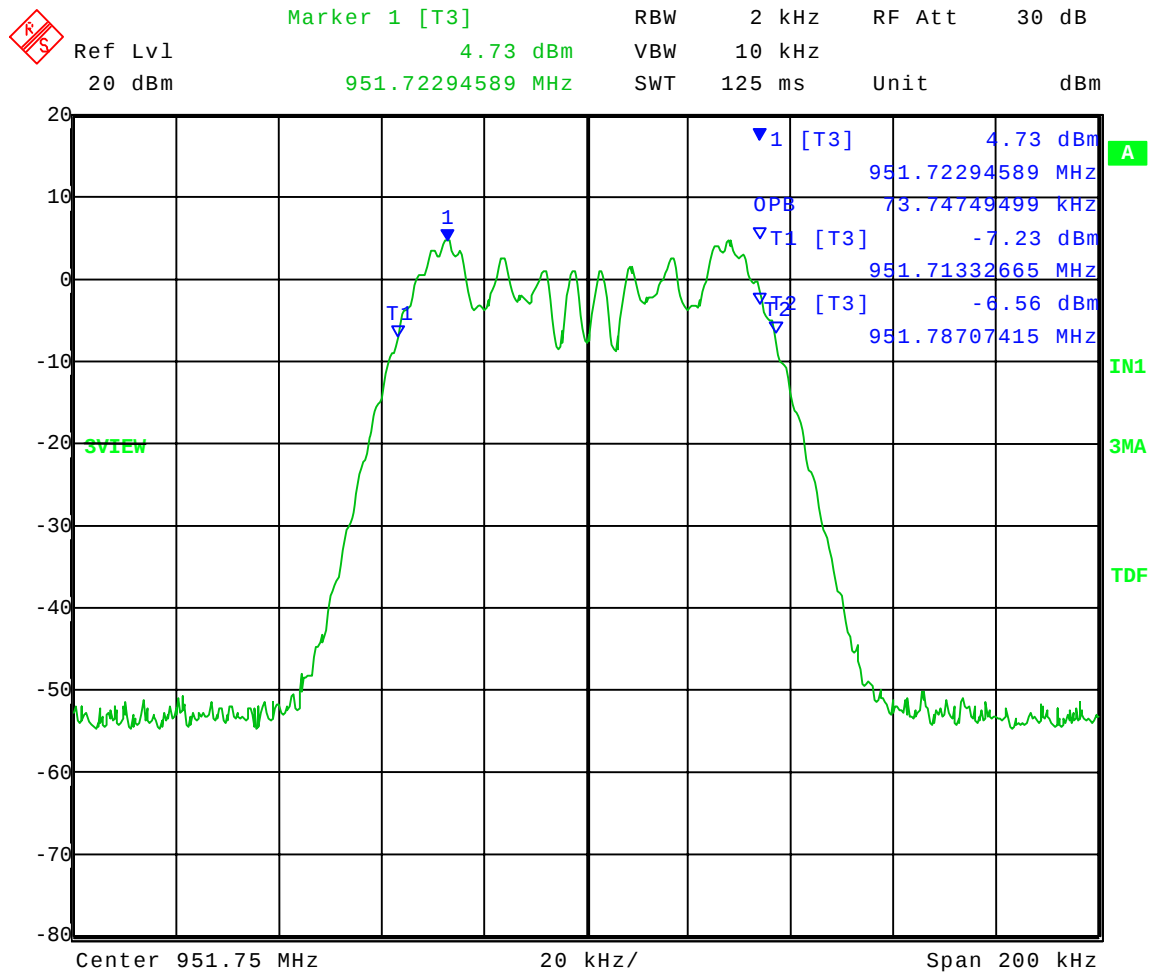
1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Occupied Bandwidth; 99% bandwidth  
Rule part: FCC Part 74; FCC Part 2.1049  
Operator: Craig B

Frequency: 951.75 MHz

99% power bandwidth = 73.75 kHz



Date: 18.DEC.2007 11:27:07



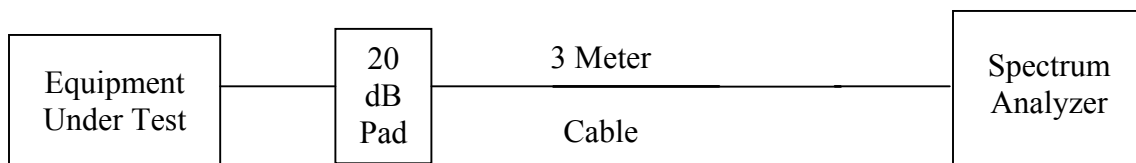
Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

### 6.0 SPURIOUS EMISSIONS AT ANTENNA TERMINALS – PART 2.1051 and EIA /TIA-603-C:2004, SECTION 2.2.13

Spurious conducted emissions were measured at the antenna terminals using an artificial load. Plots were made showing the amplitude of each harmonic emission with the equipment operated as specified in 2.989. Measurements were made up to the 10<sup>th</sup> harmonic of the fundamental. The following setup was used showing placement of the attenuators:



The allowed emissions for transmitters operating in the 944 MHz - 952 MHz bands for PSM200 TransMixer equipment are found under Part 74, Section 74.861, Paragraph d-3 for Low Power Auxiliary Stations. This paragraph states the mean power of the emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

- (1) any discrete frequency outside the authorized band shall be attenuated, at least,  $43 + 10 \log^{10}$  (mean output power, in watts) dB below the mean output power of the transmitting unit.

#### NOTE:

**The PSM200 TransMixer uses the Shure 1/4 Wave Antenna Permanently Attached.**



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

## APPENDIX A

### 7.0 FIELD STRENGTH OF SPURIOUS EMISSION MEASUREMENTS – PART 2.1053 and EIA /TIA-603-C:2004, SECTION 2.2.12

Radiated measurements were performed scanning the frequency range from 30 MHz to at least the 10<sup>th</sup> harmonic of the fundamental frequency.

For the PSM200 TransMixer, the highest fundamental frequency is 704 MHz so the scans were made up to 10000 MHz, to cover the tenth harmonic.

All signals in the frequency range of 30 MHz to 200 MHz were measured with a Biconical Antenna and from 200 MHz to 1000 MHz a Log Periodic Antenna was used as the pickup devices. From 1000 MHz to 10000 MHz, a Double Ridge Horn Antenna was used. The cables and equipment were placed and moved within the range of positions likely to find their maximum emissions. Tests were made in both the horizontal and vertical planes of polarization.

The allowed emissions for transmitters operating in the 944 MHz - 952 MHz bands for PSM200 TransMixer are found under Part 74, Section 74.861, Paragraph d-3 for Low Power Auxiliary Stations. This paragraph states that the mean power of the emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

- (1) any discrete frequency outside the authorized band shall be attenuated, at least,  $43 + 10 \log^{10}$  (mean output power, in watts) dB below the mean output power of the transmitting unit.



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

## APPENDIX A

# RADIATED EMISSION DATA & CHARTS TAKEN FOR FUNDAMENTAL EMISSIONS USING THE SUBSTITUTION METHOD EIA /TIA-603-C:2004, SECTION 2.2.12



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

## APPENDIX A

DLS Electronic Systems, Inc.

Company: Shure, Inc.  
Operator: Craig B  
Date of test: 12-17-2007  
Temperature: 67 deg. F  
Humidity: 36% R.H.  
Part 74.861(d)  
Rated Power = 30 mW = 14.77 dBm

### Spurious Emissions - ERP - Substitution Method

| Model: <b>P2T-X1</b>                                  |                                                |                                                                         |                                                                         |                              |                                  |             |             |                                 |
|-------------------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------|------------------------------|----------------------------------|-------------|-------------|---------------------------------|
| Channels: <b>944.200 MHz</b> , and <b>951.750 MHz</b> |                                                |                                                                         |                                                                         |                              |                                  |             |             |                                 |
| Frequency and Polarization (MHz)                      | Max. Field Strength of EUT @ 3 meters (dBuV/m) | Output of Signal Generator when field strength equals that of EUT (dBm) | Correction factor for cable between Signal Gen. and subst. antenna (dB) | Gain of subst. antenna (dBi) | Strength of emission [ERP] (dBm) | Limit (dBm) | Margin (dB) | Strength of emission [ERP] (mW) |
| 944.200 vertical                                      | 112.82                                         | 25.54                                                                   | 11.28                                                                   | 2.15                         | 14.3                             | 30.0        | 15.7        | 26.67                           |
| 951.750 vertical                                      | 112.25                                         | 25.26                                                                   | 11.33                                                                   | 2.15                         | 13.9                             | 30.0        | 16.1        | 24.72                           |

EIRP = Signal generator output - cable loss + antenna gain

$ERP_{(ref. to \frac{1}{2}\lambda \text{ dipole})} = \text{Signal generator output} - \text{cable loss} + \text{antenna gain} - 2.15$



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

## APPENDIX A

RADIATED EMISSION DATA AND GRAPH(S)

TAKEN FOR

SPURIOUS EMISSION MEASUREMENTS

USING THE SUBSTITUTION METHOD

EIA /TIA-603-C:2004, SECTION 2.2.12

PART 2.1053



Company: Shure Inc.  
 Model Tested: P2T-X1  
 Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

DLS Electronic Systems, Inc.

Company: Shure, Inc.  
 Operator: Craig B  
 Date of test: 12-17-2007  
 Temperature: 67 deg. F.  
 Humidity: 36% R.H.

| Radiated Spurious Emissions (e.r.p. substitution method) FCC Part 74; FCC Part 2.1053 |                                   |                                |                     |              |              |                                    |                               |                                  |
|---------------------------------------------------------------------------------------|-----------------------------------|--------------------------------|---------------------|--------------|--------------|------------------------------------|-------------------------------|----------------------------------|
| Model: <b>P2T-X1</b> Transmit Frequency: <b>944.200 MHz</b>                           |                                   |                                |                     |              |              |                                    |                               |                                  |
| Frequency<br>GHz                                                                      | Field Strength<br>Level<br>dBuV/m | Factor to<br>Convert to<br>dBm | Power<br>ERP<br>dBm | Limit<br>dBm | Margin<br>dB | Receive<br>Antenna<br>Polarization | EUT<br>Antenna<br>Orientation | Receive<br>Antenna<br>Height (m) |
| 1.88840                                                                               | 74.9                              | 99.0                           | -24.1               | -13          | 11.1         | Horizontal                         | 330                           | 1.2                              |
| 2.83260                                                                               | 69.8                              | 101.0                          | -31.2               | -13          | 18.2         | Horizontal                         | 135                           | 1.0                              |
| 3.77680                                                                               | 74.2                              | 100.1                          | -25.9               | -13          | 12.9         | Horizontal                         | 150                           | 1.0                              |
| 4.72100                                                                               | 72.6                              | 98.6                           | -26.0               | -13          | 13.0         | Horizontal                         | 135                           | 1.1                              |
| 5.66520                                                                               | 56.3                              | 98.8                           | -42.5               | -13          | 29.5         | Horizontal                         | 60                            | 1.0                              |
| 6.60940                                                                               | 58.5                              | 98.1                           | -39.6               | -13          | 26.6         | Horizontal                         | 180                           | 1.0                              |
| 7.55360                                                                               | 65.9                              | 98.7                           | -32.8               | -13          | 19.8         | Horizontal                         | 225                           | 1.0                              |
| 8.49780                                                                               | 53.5                              | 99.2                           | -45.7               | -13          | 32.7         | Horizontal                         | 160                           | 1.1                              |
| 9.44200                                                                               | 46.4                              | 98.3                           | -51.9               | -13          | 38.9         | Horizontal                         | 120                           | 1.0                              |
| 1.88840                                                                               | 71.0                              | 98.5                           | -27.5               | -13          | 14.5         | Vertical                           | 180                           | 1.0                              |
| 2.83260                                                                               | 65.1                              | 99.0                           | -33.9               | -13          | 20.9         | Vertical                           | 170                           | 1.0                              |
| 3.77680                                                                               | 71.0                              | 99.5                           | -28.5               | -13          | 15.5         | Vertical                           | 270                           | 1.2                              |
| 4.72100                                                                               | 70.2                              | 99.8                           | -29.6               | -13          | 16.6         | Vertical                           | 315                           | 1.0                              |
| 5.66520                                                                               | 53.6                              | 100.0                          | -46.4               | -13          | 33.4         | Vertical                           | 330                           | 1.0                              |
| 6.60940                                                                               | 53.9                              | 99.2                           | -45.3               | -13          | 32.3         | Vertical                           | 160                           | 1.1                              |
| 7.55360                                                                               | 63.2                              | 100.3                          | -37.1               | -13          | 24.1         | Vertical                           | 225                           | 1.1                              |
| 8.49780                                                                               | 51.0                              | 101.5                          | -50.5               | -13          | 37.5         | Vertical                           | 225                           | 1.1                              |
| 9.44200                                                                               | 47.0                              | 100.3                          | -53.3               | -13          | 40.3         | Vertical                           | 135                           | 1.0                              |



Company: Shure Inc.  
 Model Tested: P2T-X1  
 Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

DLS Electronic Systems, Inc.

Company: Shure, Inc.  
 Operator: Craig B  
 Date of test: 12-17-2007  
 Temperature: 67 deg. F.  
 Humidity: 36% R.H.

| Radiated Spurious Emissions (e.r.p. substitution method) FCC Part 74; FCC Part 2.1053 |                                   |                                |                     |              |              |                                    |                               |                                  |
|---------------------------------------------------------------------------------------|-----------------------------------|--------------------------------|---------------------|--------------|--------------|------------------------------------|-------------------------------|----------------------------------|
| Model: <b>P2T-X1</b> Transmit Frequency: <b>951.750 MHz</b>                           |                                   |                                |                     |              |              |                                    |                               |                                  |
| Frequency<br>GHz                                                                      | Field Strength<br>Level<br>dBuV/m | Factor to<br>Convert to<br>dBm | Power<br>ERP<br>dBm | Limit<br>dBm | Margin<br>dB | Receive<br>Antenna<br>Polarization | EUT<br>Antenna<br>Orientation | Receive<br>Antenna<br>Height (m) |
| 1.90350                                                                               | 73.6                              | 98.6                           | -25.0               | -13          | 12.0         | Horizontal                         | 315                           | 1.3                              |
| 2.85525                                                                               | 69.4                              | 100.9                          | -31.5               | -13          | 18.5         | Horizontal                         | 120                           | 1.0                              |
| 3.80700                                                                               | 71.8                              | 99.7                           | -27.9               | -13          | 14.9         | Horizontal                         | 135                           | 1.1                              |
| 4.75875                                                                               | 70.2                              | 98.3                           | -28.1               | -13          | 15.1         | Horizontal                         | 135                           | 1.1                              |
| 5.71050                                                                               | 55.2                              | 98.9                           | -43.7               | -13          | 30.7         | Horizontal                         | 90                            | 1.1                              |
| 6.66225                                                                               | 59.8                              | 97.9                           | -38.1               | -13          | 25.1         | Horizontal                         | 180                           | 1.0                              |
| 7.61400                                                                               | 63.1                              | 99.1                           | -36.0               | -13          | 23.0         | Horizontal                         | 225                           | 1.0                              |
| 8.56575                                                                               | 52.1                              | 99.1                           | -47.0               | -13          | 34.0         | Horizontal                         | 170                           | 1.1                              |
| 9.51750                                                                               | 44.6                              | 98.0                           | -53.4               | -13          | 40.4         | Horizontal                         | 135                           | 1.0                              |
| 1.90350                                                                               | 70.7                              | 98.3                           | -27.6               | -13          | 14.6         | Vertical                           | 180                           | 1.0                              |
| 2.85525                                                                               | 63.7                              | 99.7                           | -36.0               | -13          | 23.0         | Vertical                           | 180                           | 1.0                              |
| 3.80700                                                                               | 68.3                              | 99.0                           | -30.7               | -13          | 17.7         | Vertical                           | 270                           | 1.0                              |
| 4.75875                                                                               | 70.1                              | 99.3                           | -29.2               | -13          | 16.2         | Vertical                           | 315                           | 1.0                              |
| 5.71050                                                                               | 55.4                              | 100.3                          | -44.9               | -13          | 31.9         | Vertical                           | 180                           | 1.1                              |
| 6.66225                                                                               | 53.4                              | 99.1                           | -45.7               | -13          | 32.7         | Vertical                           | 200                           | 1.2                              |
| 7.61400                                                                               | 61.9                              | 100.5                          | -38.6               | -13          | 25.6         | Vertical                           | 135                           | 1.0                              |
| 8.56575                                                                               | 52.2                              | 101.0                          | -48.8               | -13          | 35.8         | Vertical                           | 225                           | 1.0                              |
| 9.51750                                                                               | 45.4                              | 100.4                          | -55.0               | -13          | 42.0         | Vertical                           | 150                           | 1.0                              |



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

## APPENDIX A

### 8.0 FREQUENCY STABILITY (TEMPERATURE)– PART 2.1055(a1)

The frequency stability was measured from -30° to +50° centigrade at intervals of 10° centigrade throughout the range. Prior to each frequency measurement, the equipment was left alone for a sufficient period of time (approximately 30 minutes or more) to allow the components of the Wireless Boundary Microphone oscillator circuitry to stabilize.

See the following page for the data taken during testing.

### 9.0 FREQUENCY STABILITY (VOLTAGE VARIATION)– PART 2.1055(d2)

The frequency stability of Wireless Boundary Microphone was measured by reducing the primary supply voltage to the battery end point specified by the manufacturer.

See the following page for the data taken during testing.



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

## APPENDIX A

### DATA TAKEN FOR FREQUENCY

### STABILITY WHEN VARYING THE TEMPERATURE AND PRIMARY SUPPLY VOLTAGE VARIATION

### PART 2.1055a(1) & PART 2.1055d(d2)

### BAND-EDGE COMPLIANCE

### EIA /TIA-603-C:2004, SECTION 2.2.13

### PART 2.1051

### LOW CHANNEL



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

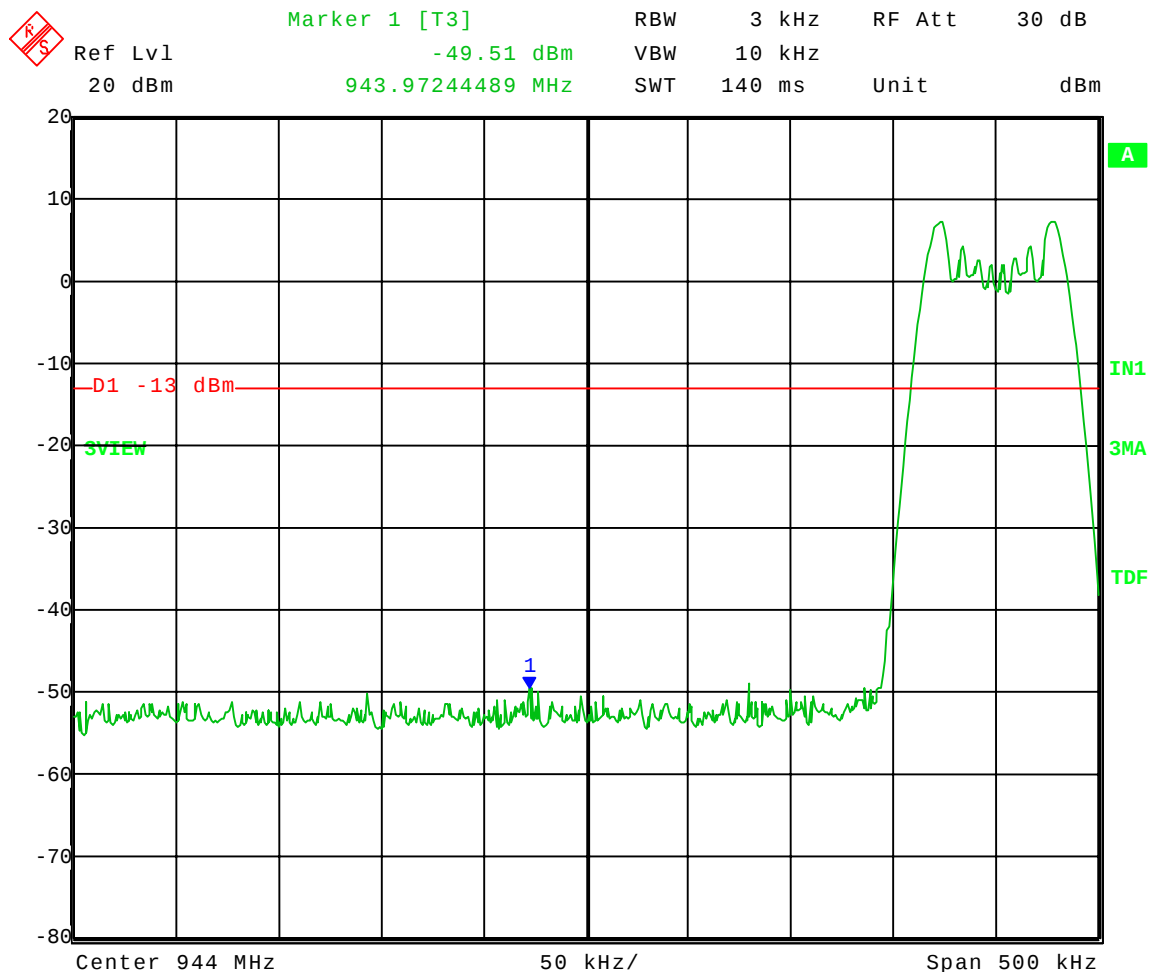
1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 944.2 MHz

Operating conditions: 102 V 20° C

Band-Edge Frequency = 944 MHz  
Band-Edge limit = -13 dBm



Date: 18.DEC.2007 11:39:44



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

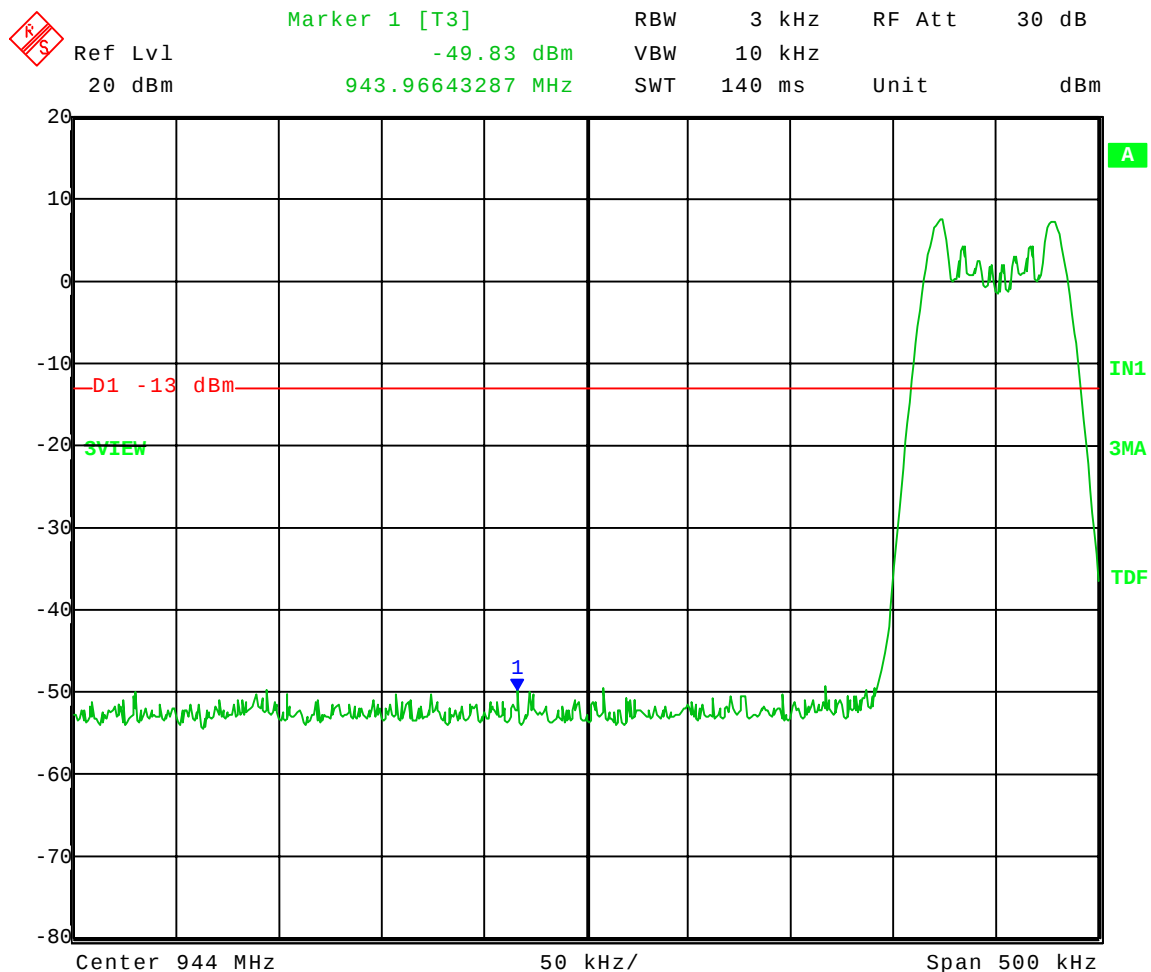
1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 944.2 MHz

Operating conditions: 138 V 20° C

Band-Edge Frequency = 944 MHz  
Band-Edge limit = -13 dBm



Date: 18.DEC.2007 11:41:28



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

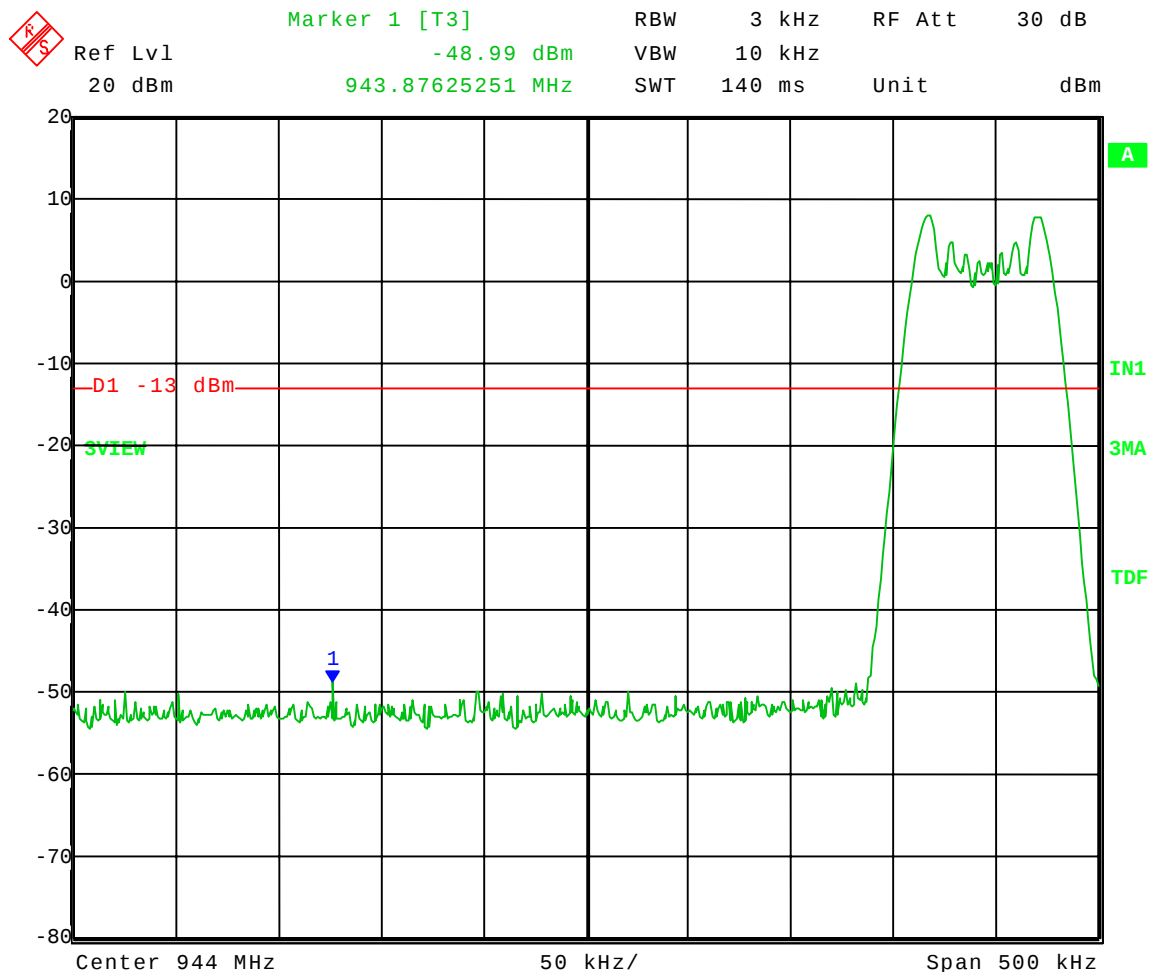
1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 944.2 MHz

Operating conditions: 120 V -30° C

Band-Edge Frequency = 944 MHz  
Band-Edge limit = -13 dBm



Date: 18.DEC.2007 16:37:49



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

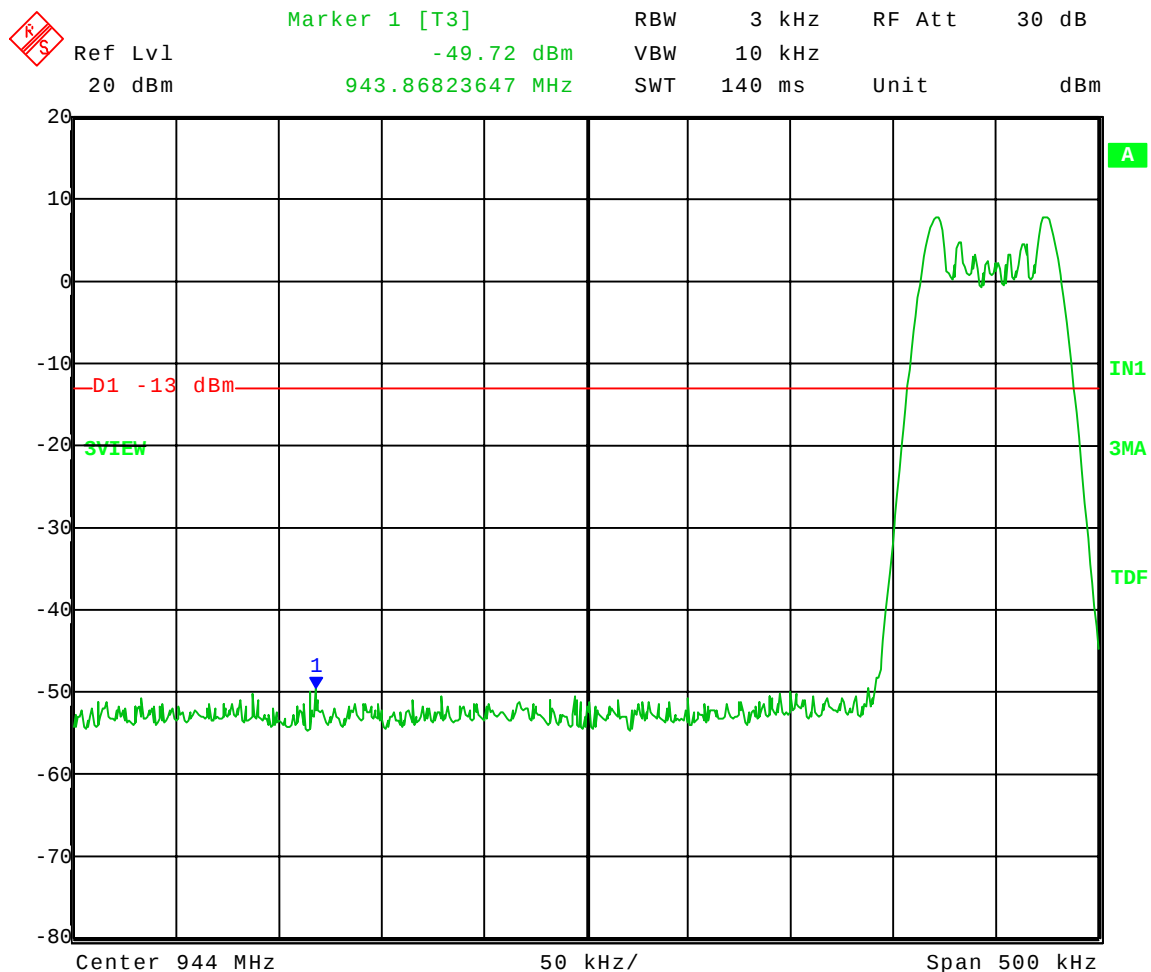
## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 944.2 MHz

Operating conditions: 120 V -20° C

Band-Edge Frequency = 944 MHz

Band-Edge limit = -13 dBm



Date: 18.DEC.2007 16:04:53



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

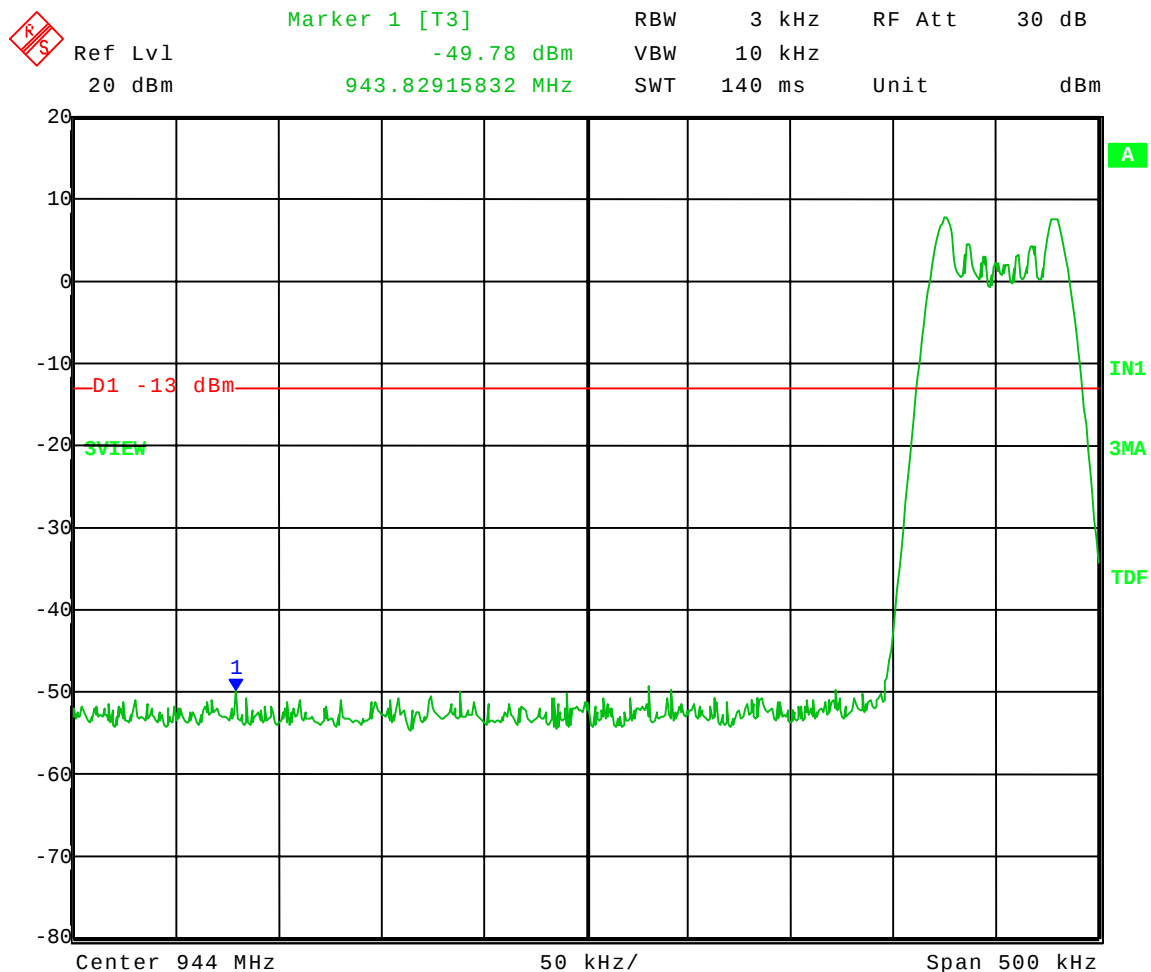
## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 944.2 MHz

Operating conditions: 120 V **-10° C**

Band-Edge Frequency = **944 MHz**

Band-Edge limit = -13 dBm



Date: 18.DEC.2007 15:33:18



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

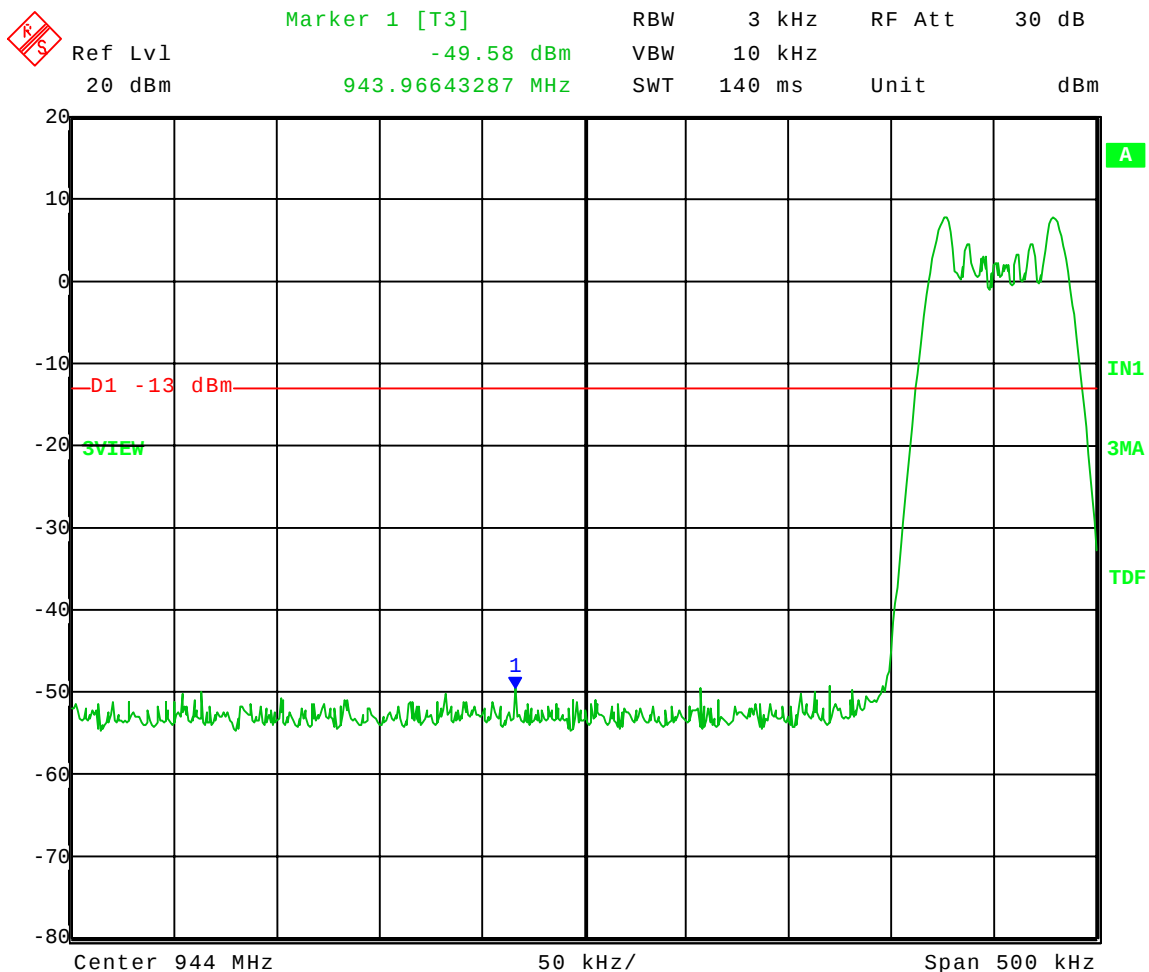
## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 944.2 MHz

Operating conditions: 120 V 0° C

Band-Edge Frequency = 944 MHz

Band-Edge limit = -13 dBm



Date: 18.DEC.2007 14:57:15



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

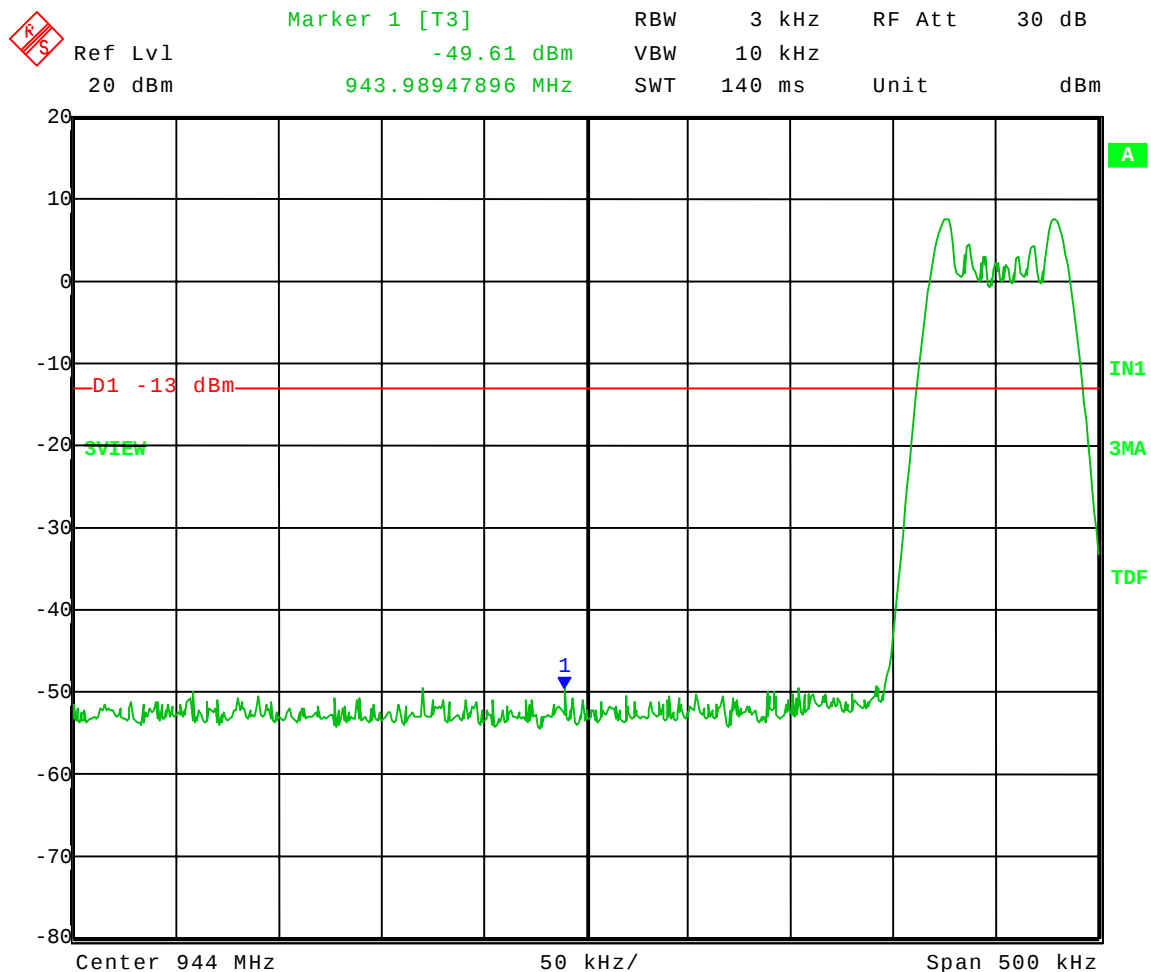
## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 944.2 MHz

Operating conditions: 120 V 10° C

Band-Edge Frequency = 944 MHz

Band-Edge limit = -13 dBm



Date: 18.DEC.2007 14:23:35



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

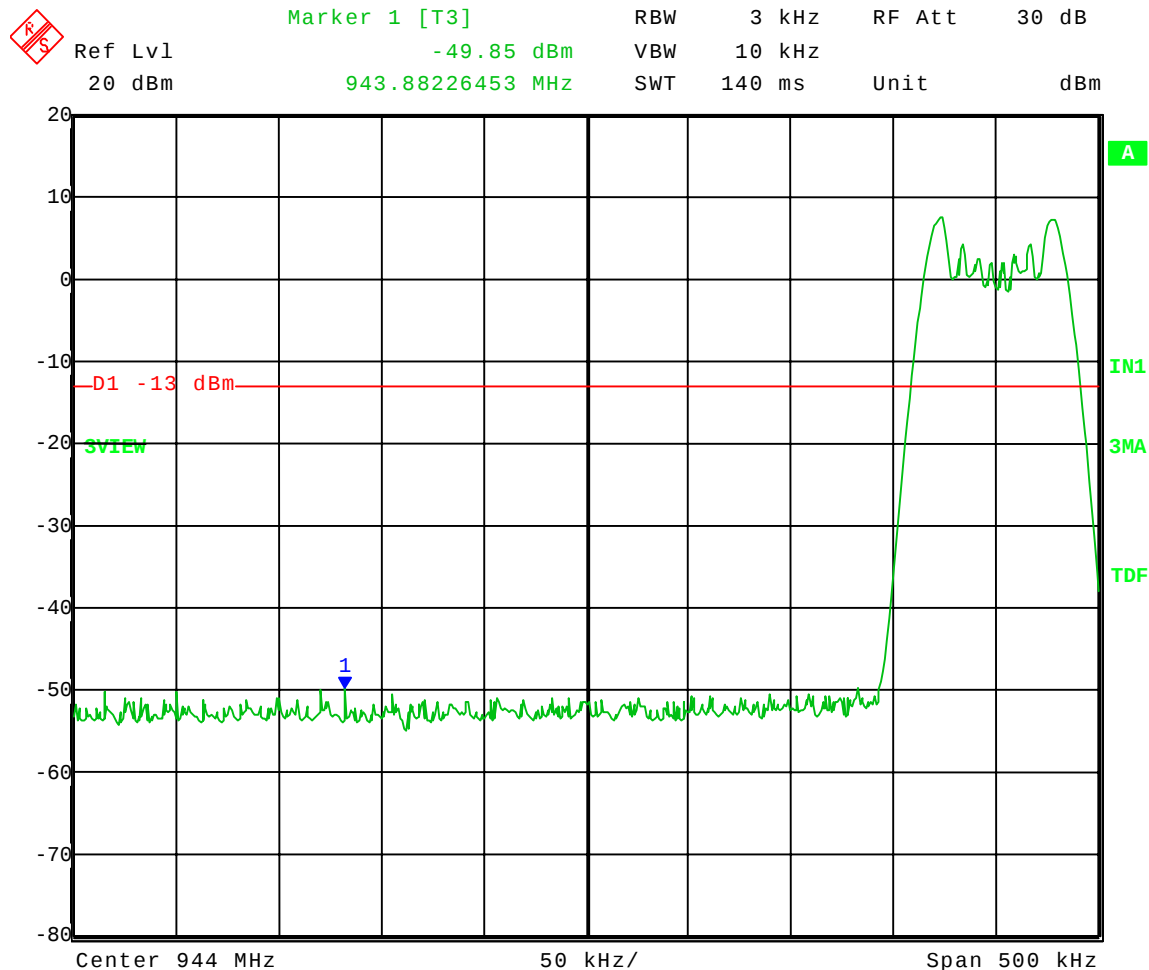
## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 944.2 MHz

Operating conditions: 120 V 20° C

Band-Edge Frequency = 944 MHz

Band-Edge limit = -13 dBm



Date: 18.DEC.2007 11:46:10



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

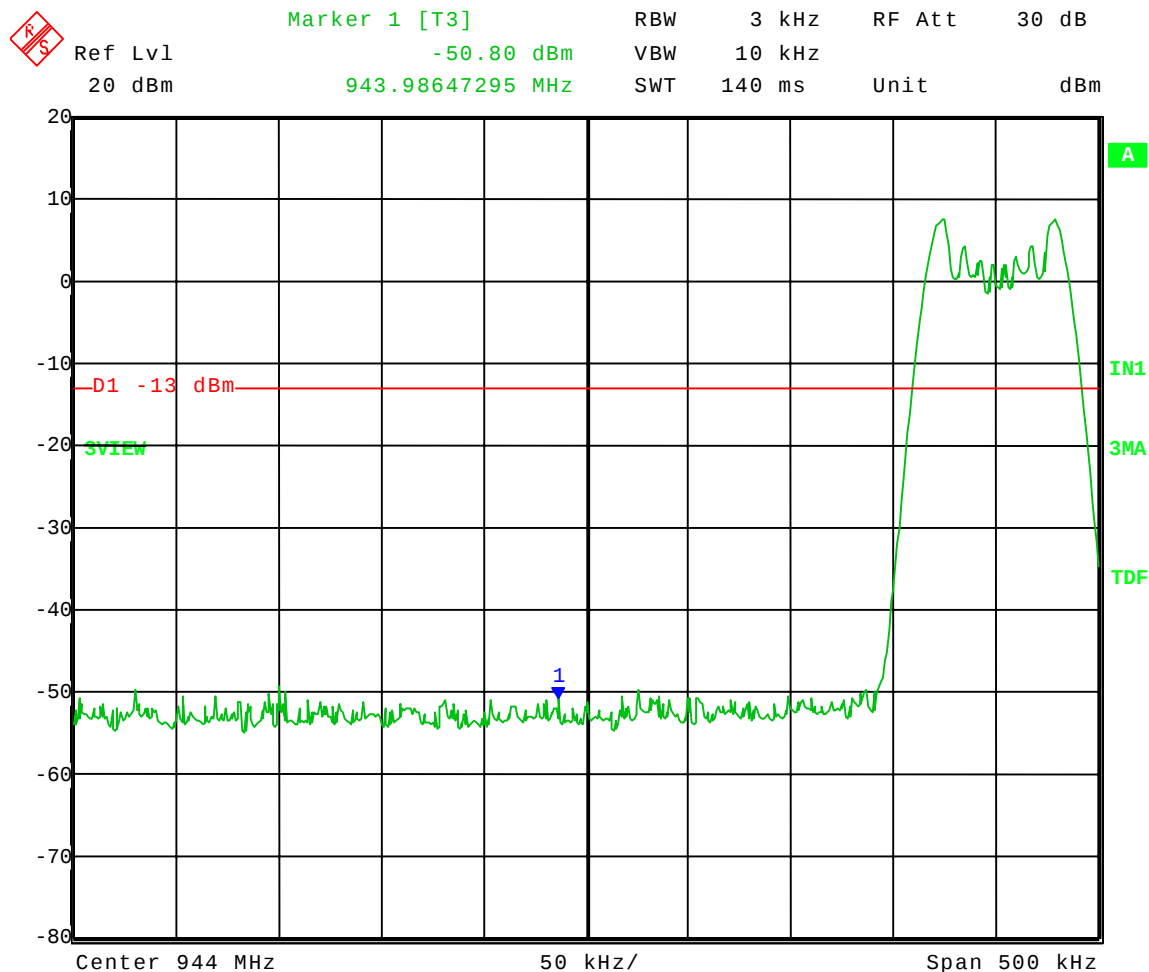
## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 944.2 MHz

Operating conditions: 120 V 30° C

Band-Edge Frequency = 944 MHz

Band-Edge limit = -13 dBm



Date: 18.DEC.2007 12:18:21



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

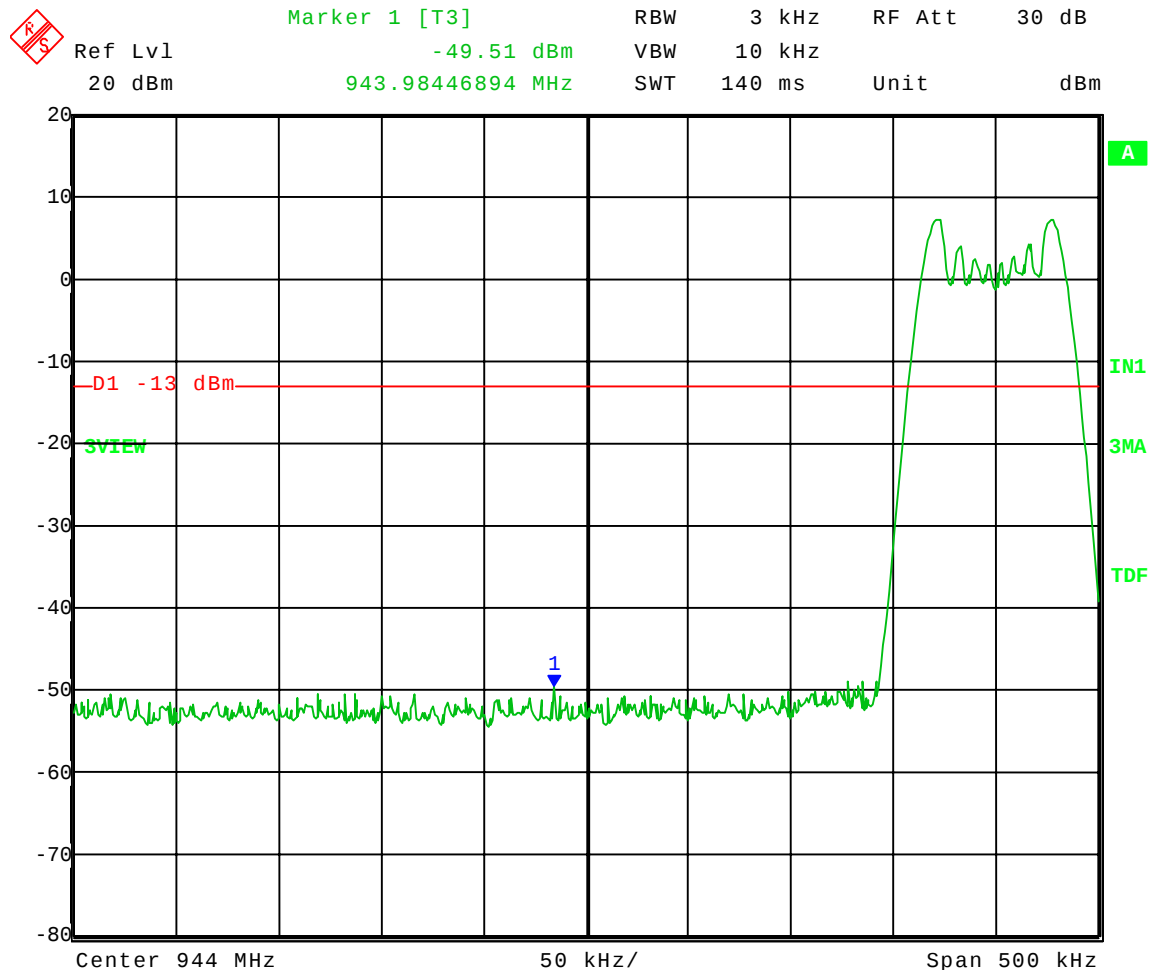
## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 944.2 MHz

Operating conditions: 120 V 40° C

Band-Edge Frequency = 944 MHz

Band-Edge limit = -13 dBm



Date: 18.DEC.2007 12:50:28



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

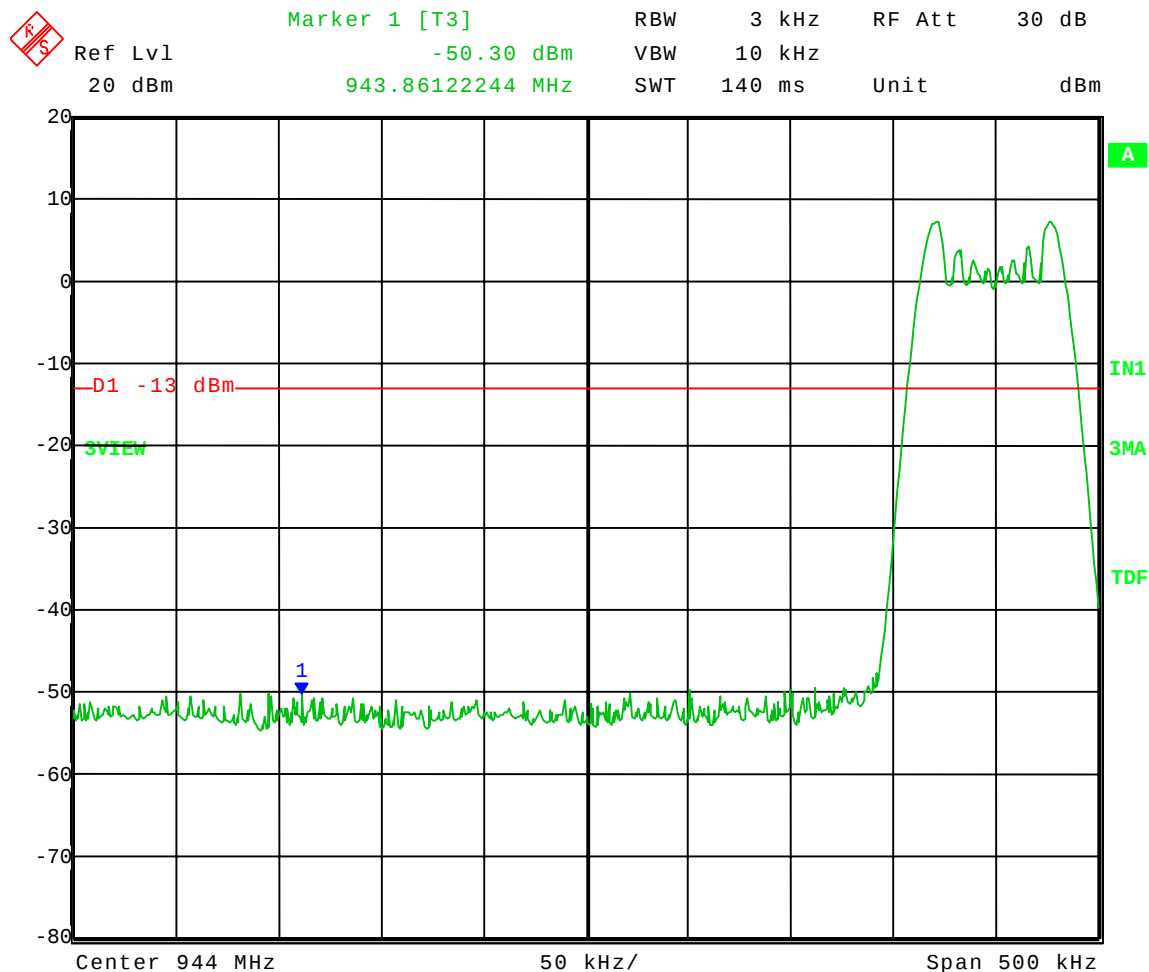
1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 944.2 MHz

Operating conditions: 120 V 50° C

Band-Edge Frequency = 944 MHz  
Band-Edge limit = -13 dBm



Date: 18.DEC.2007 13:46:54



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

## APPENDIX A

### DATA TAKEN FOR FREQUENCY

### STABILITY WHEN VARYING THE TEMPERATURE AND PRIMARY SUPPLY VOLTAGE VARIATION

### PART 2.1055a(1) & PART 2.1055d(d2)

### BAND-EDGE COMPLIANCE

### EIA /TIA-603-C:2004, SECTION 2.2.13

### PART 2.1051

### HIGH CHANNEL



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

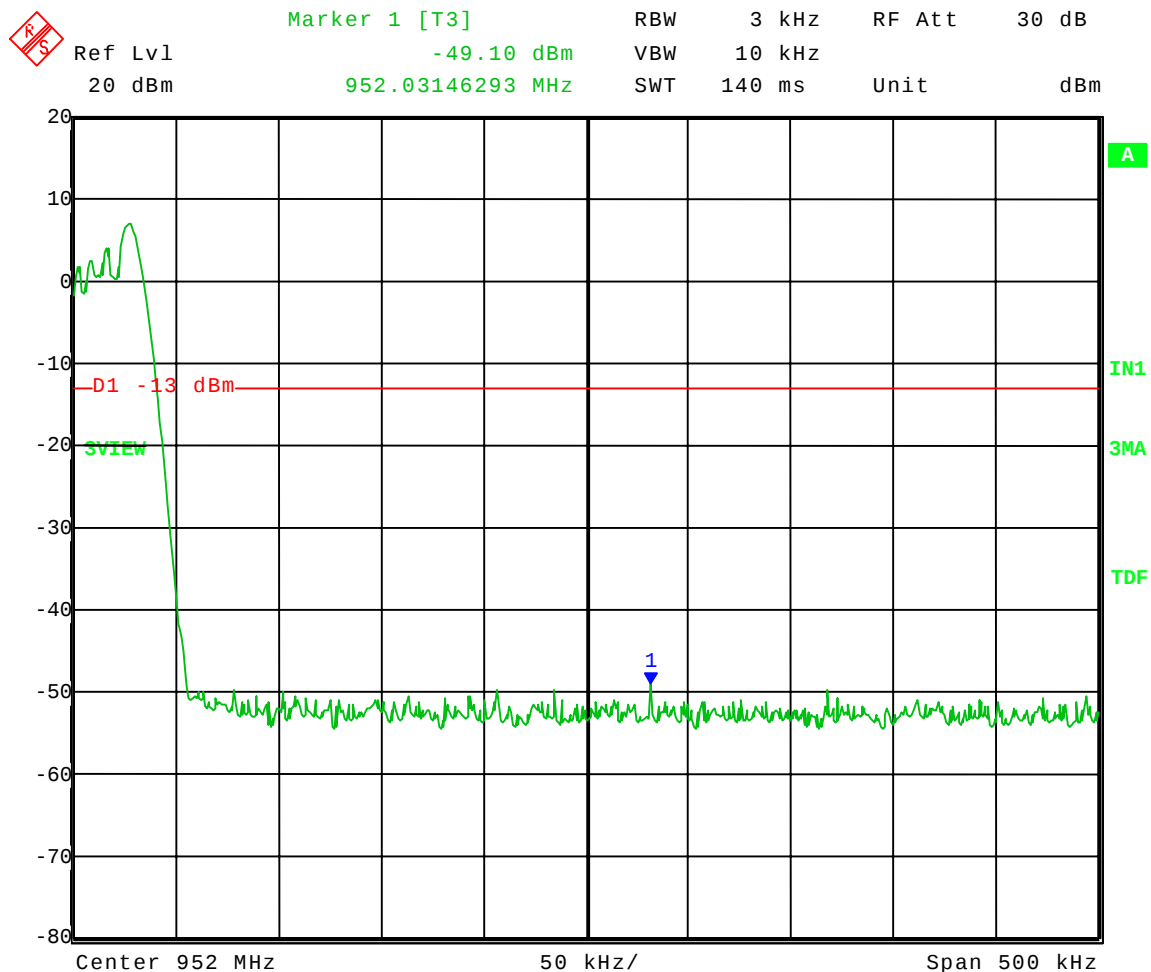
1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 951.75 MHz

Operating conditions: 102 V 20° C

Band-Edge Frequency = 952 MHz  
Band-Edge limit = -13 dBm



Date: 18.DEC.2007 11:38:19



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

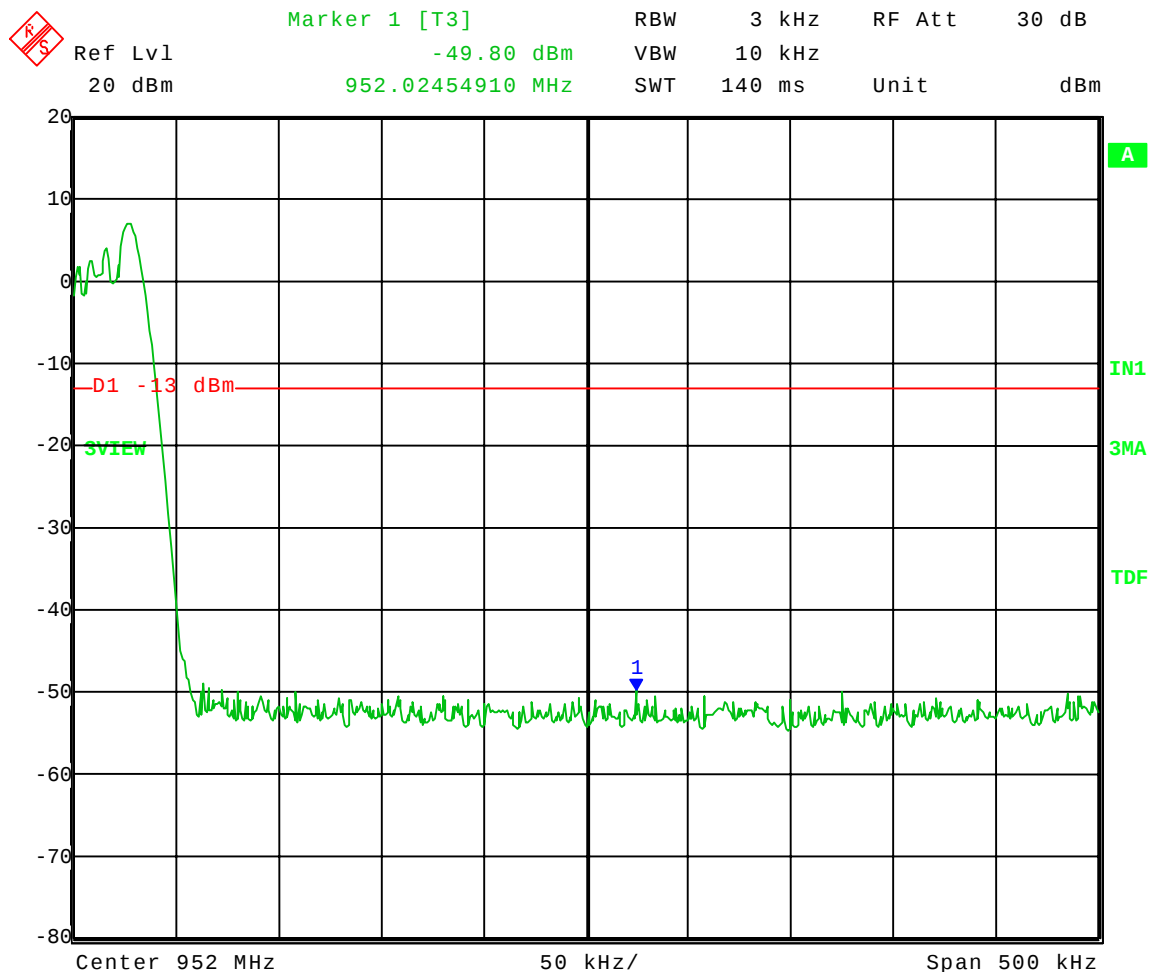
1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 951.75 MHz

Operating conditions: 138 V 20° C

Band-Edge Frequency = 952 MHz  
Band-Edge limit = -13 dBm



Date: 18.DEC.2007 11:42:48



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

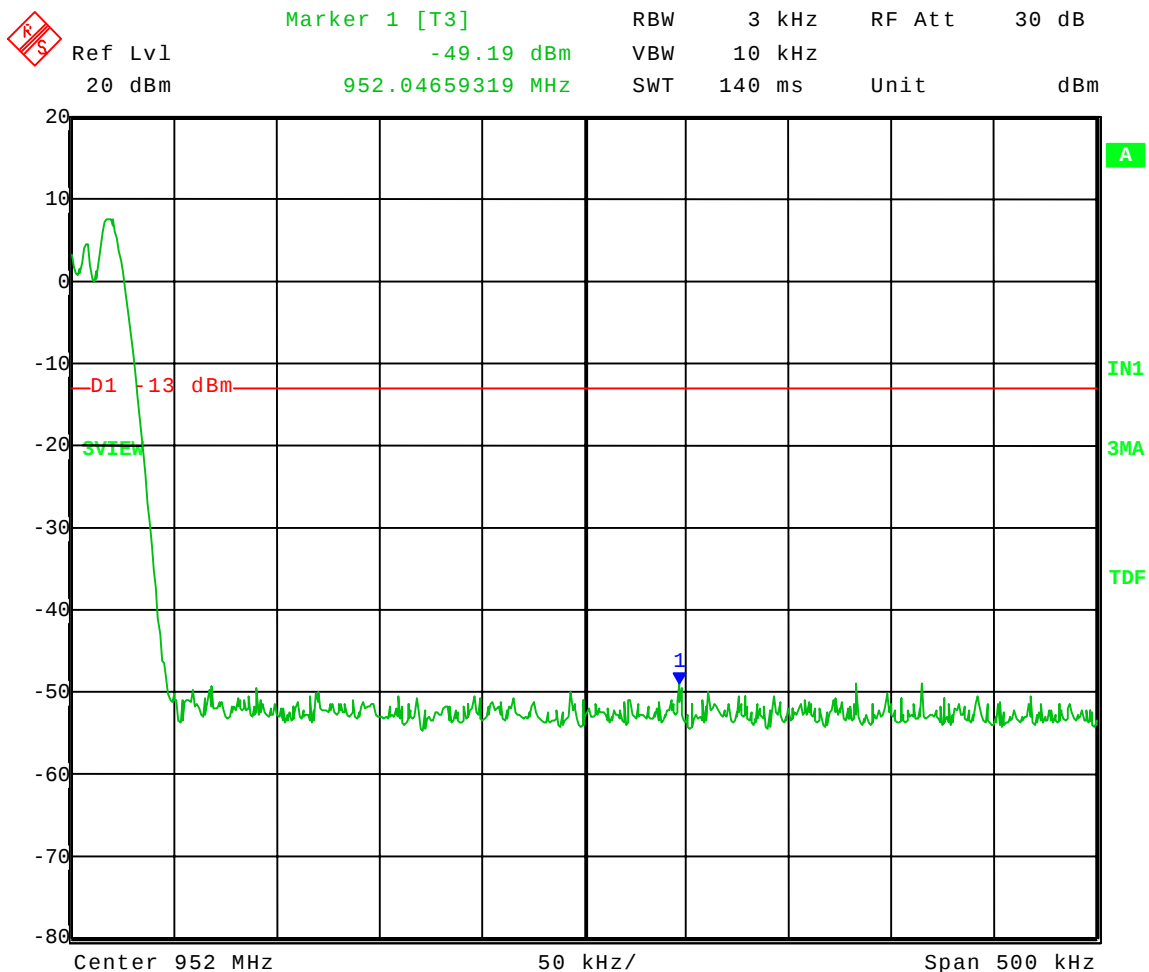
1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 951.75 MHz

Operating conditions: 120 V -30° C

Band-Edge Frequency = 952 MHz  
Band-Edge limit = -13 dBm



Date: 18.DEC.2007 16:36:19



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

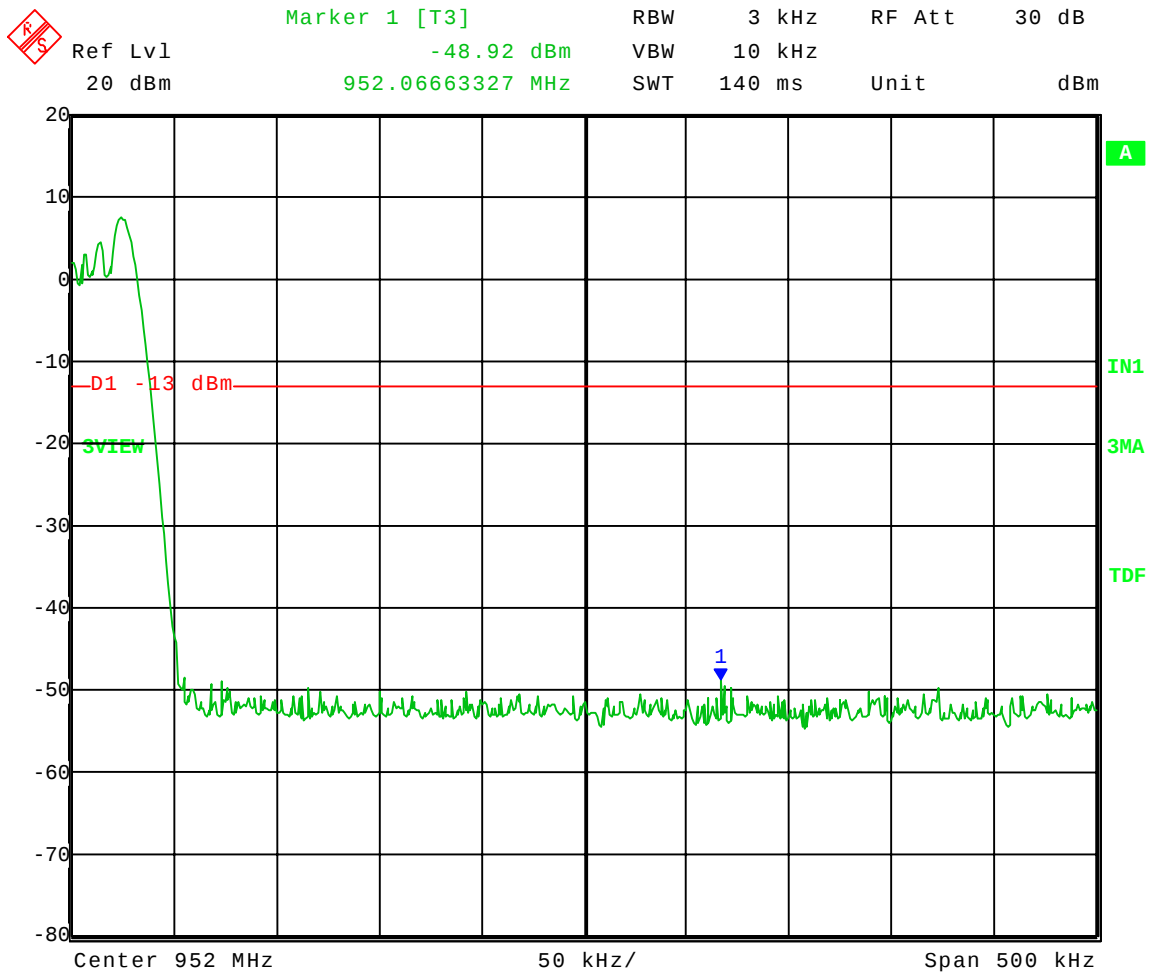
1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 951.75 MHz

Operating conditions: 120 V -20° C

Band-Edge Frequency = 952 MHz  
Band-Edge limit = -13 dBm



Date: 18.DEC.2007 16:06:29



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

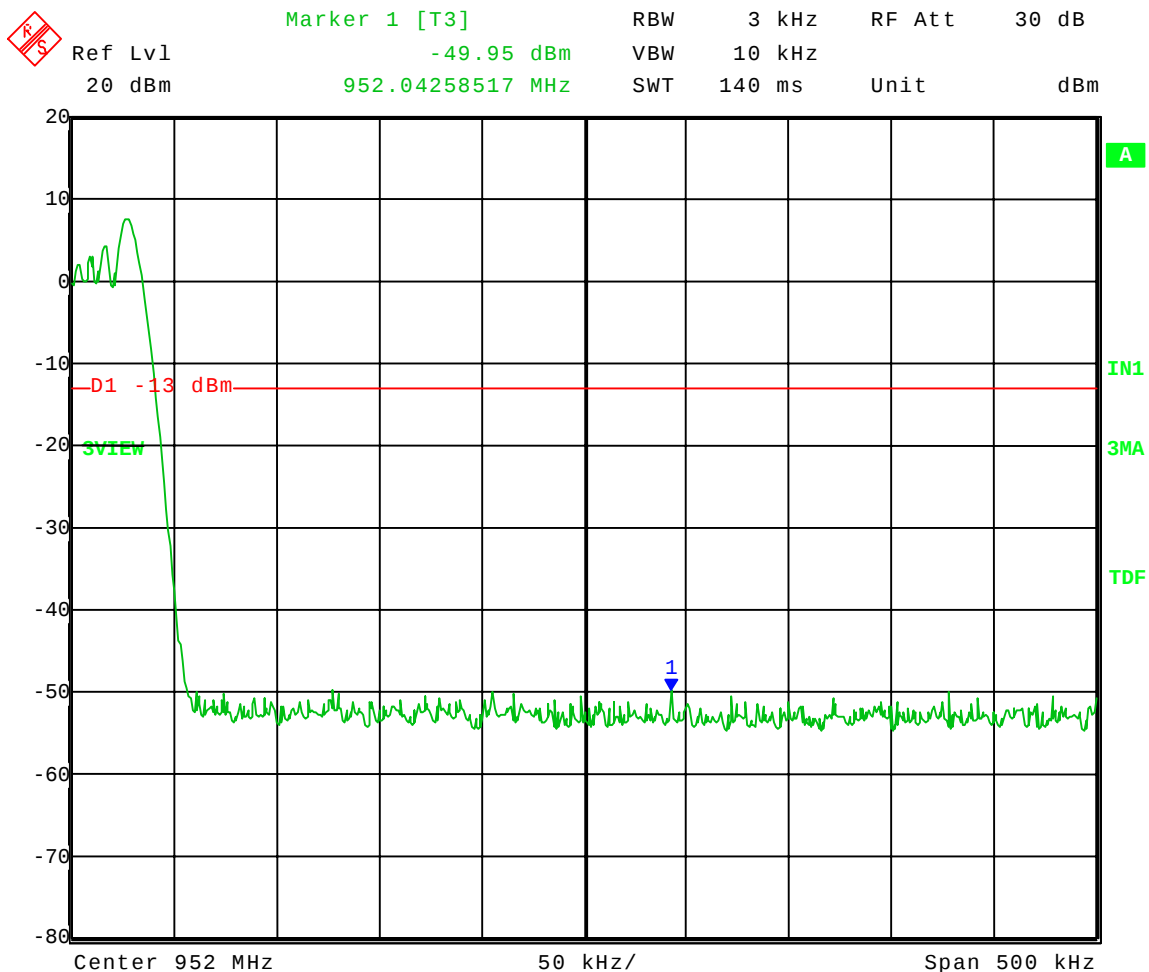
1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 951.75 MHz

Operating conditions: 120 V -10° C

Band-Edge Frequency = 952 MHz  
Band-Edge limit = -13 dBm



Date: 18.DEC.2007 15:31:13



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

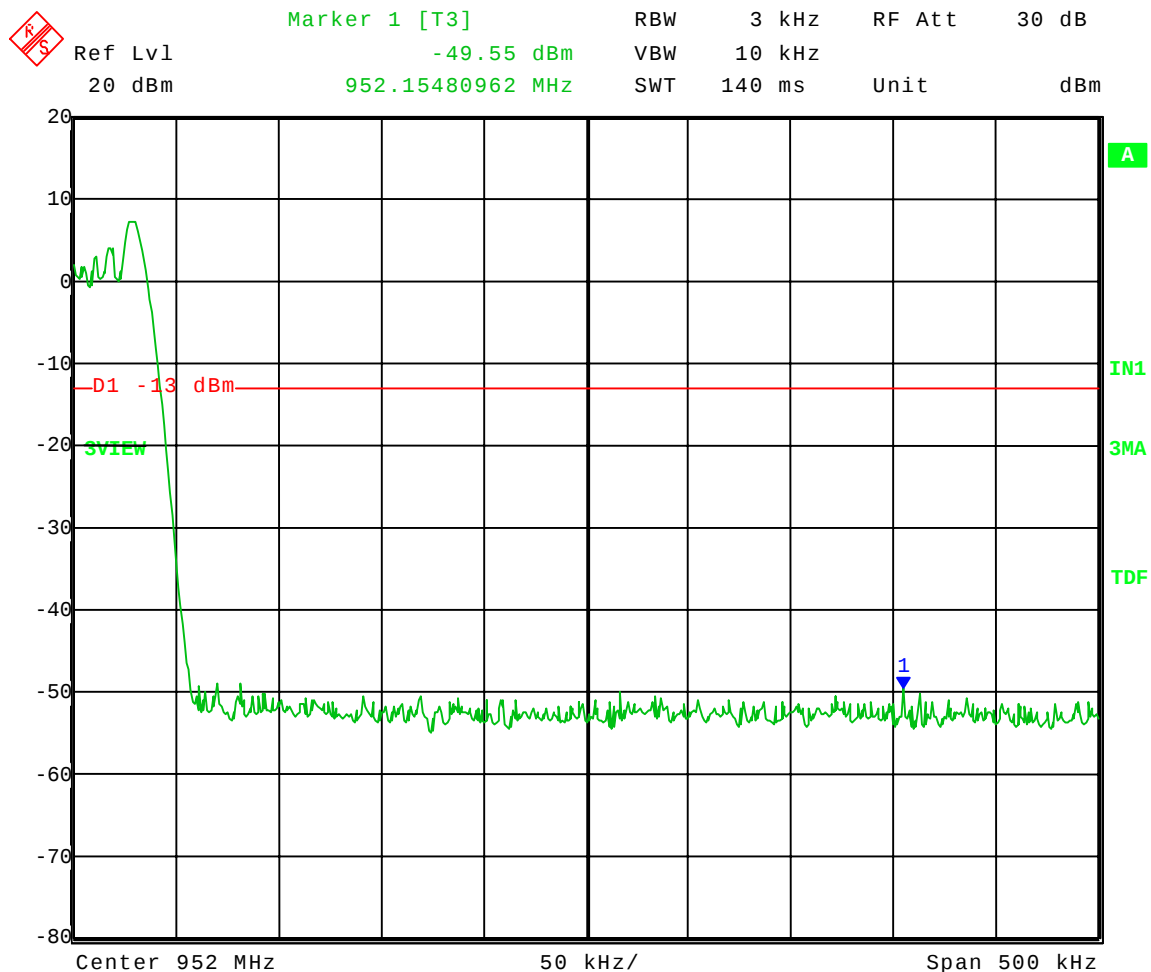
1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 951.75 MHz

Operating conditions: 120 V 0° C

Band-Edge Frequency = 952 MHz  
Band-Edge limit = -13 dBm



Date: 18.DEC.2007 14:58:50



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

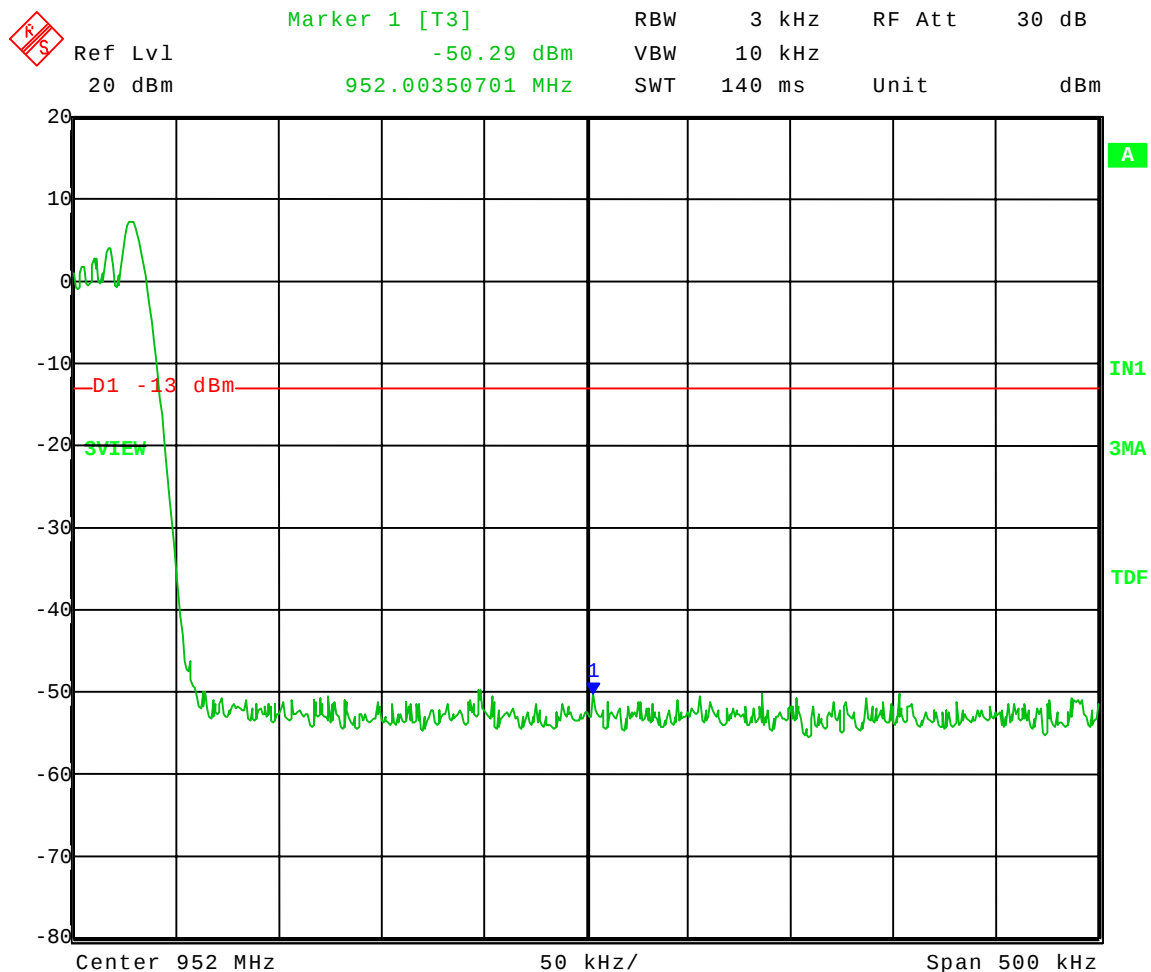
1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 951.75 MHz

Operating conditions: 120 V 10° C

Band-Edge Frequency = 952 MHz  
Band-Edge limit = -13 dBm



Date: 18.DEC.2007 14:21:53



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

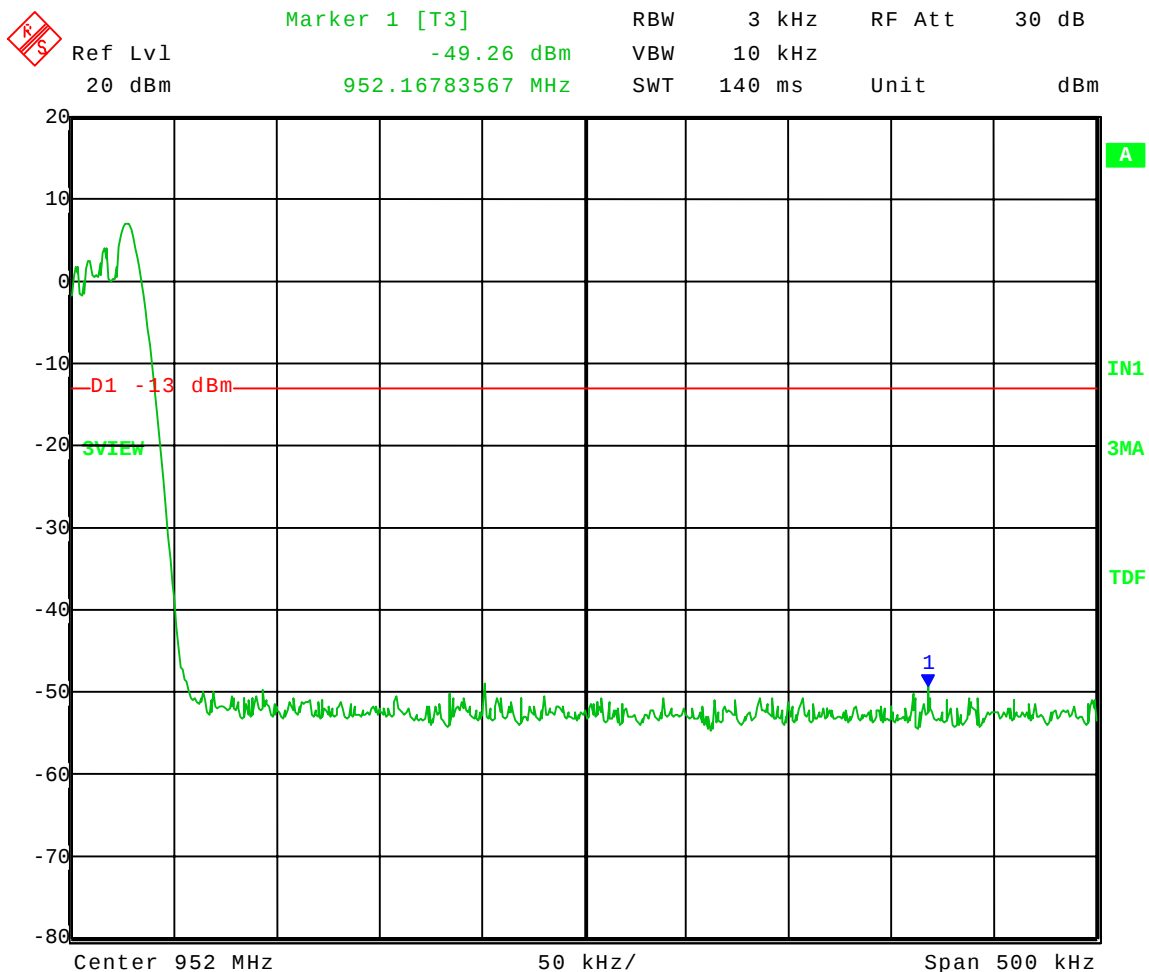
1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 951.75 MHz

Operating conditions: 120 V 20° C

Band-Edge Frequency = 952 MHz  
Band-Edge limit = -13 dBm



Date: 18.DEC.2007 11:44:43



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

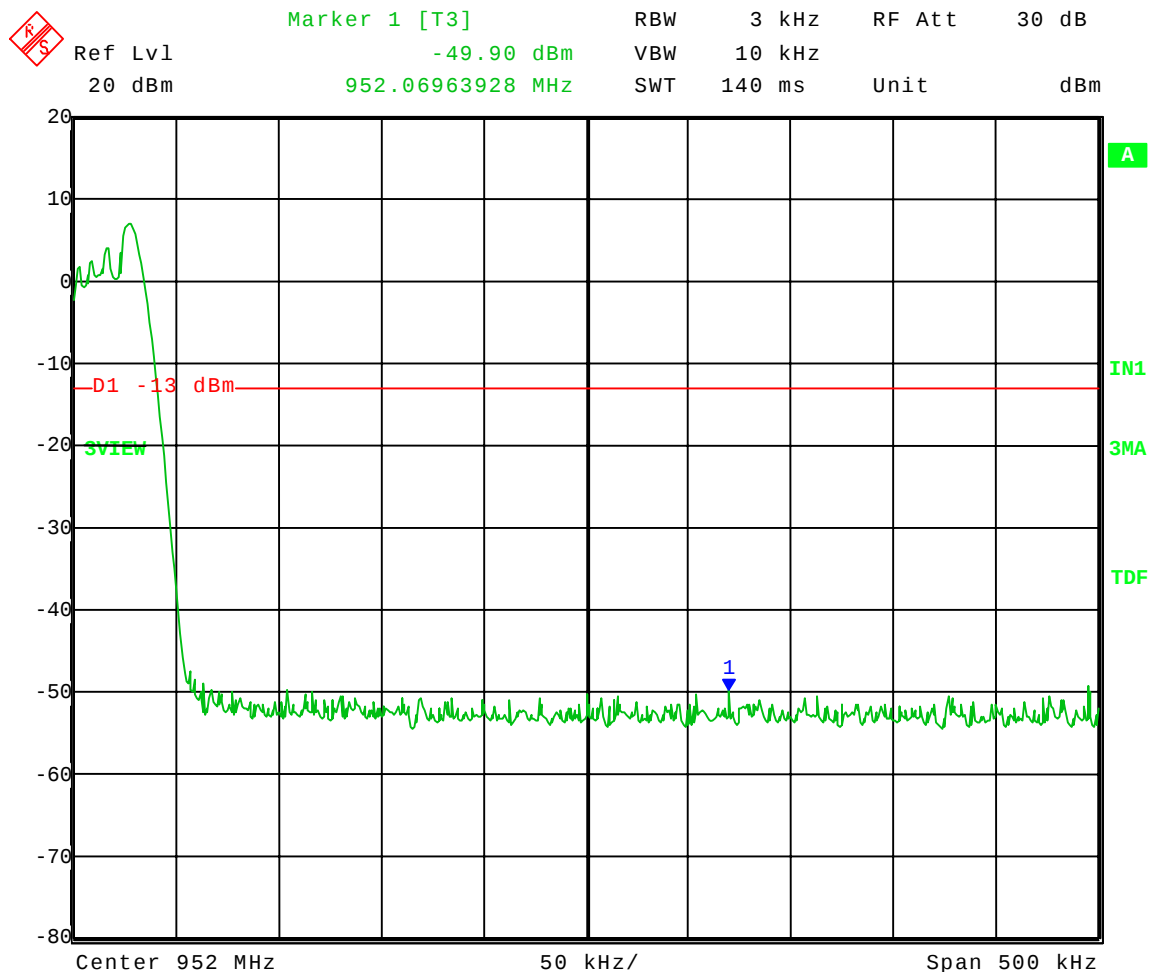
1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 951.75 MHz

Operating conditions: 120 V 30° C

Band-Edge Frequency = 952 MHz  
Band-Edge limit = -13 dBm



Date: 18.DEC.2007 12:20:05



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

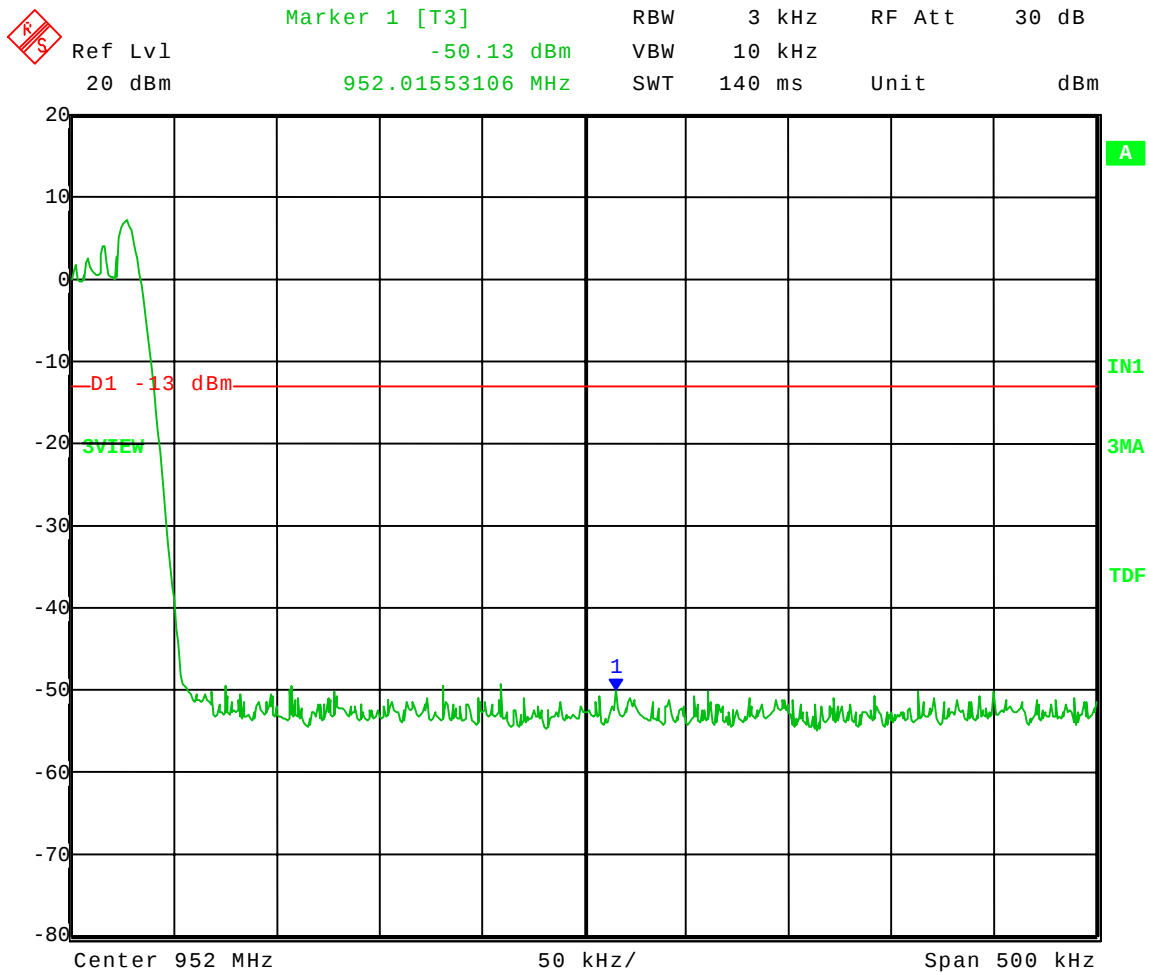
1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 951.75 MHz

Operating conditions: 120 V 40° C

Band-Edge Frequency = 952 MHz  
Band-Edge limit = -13 dBm



Date: 18.DEC.2007 12:48:28



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

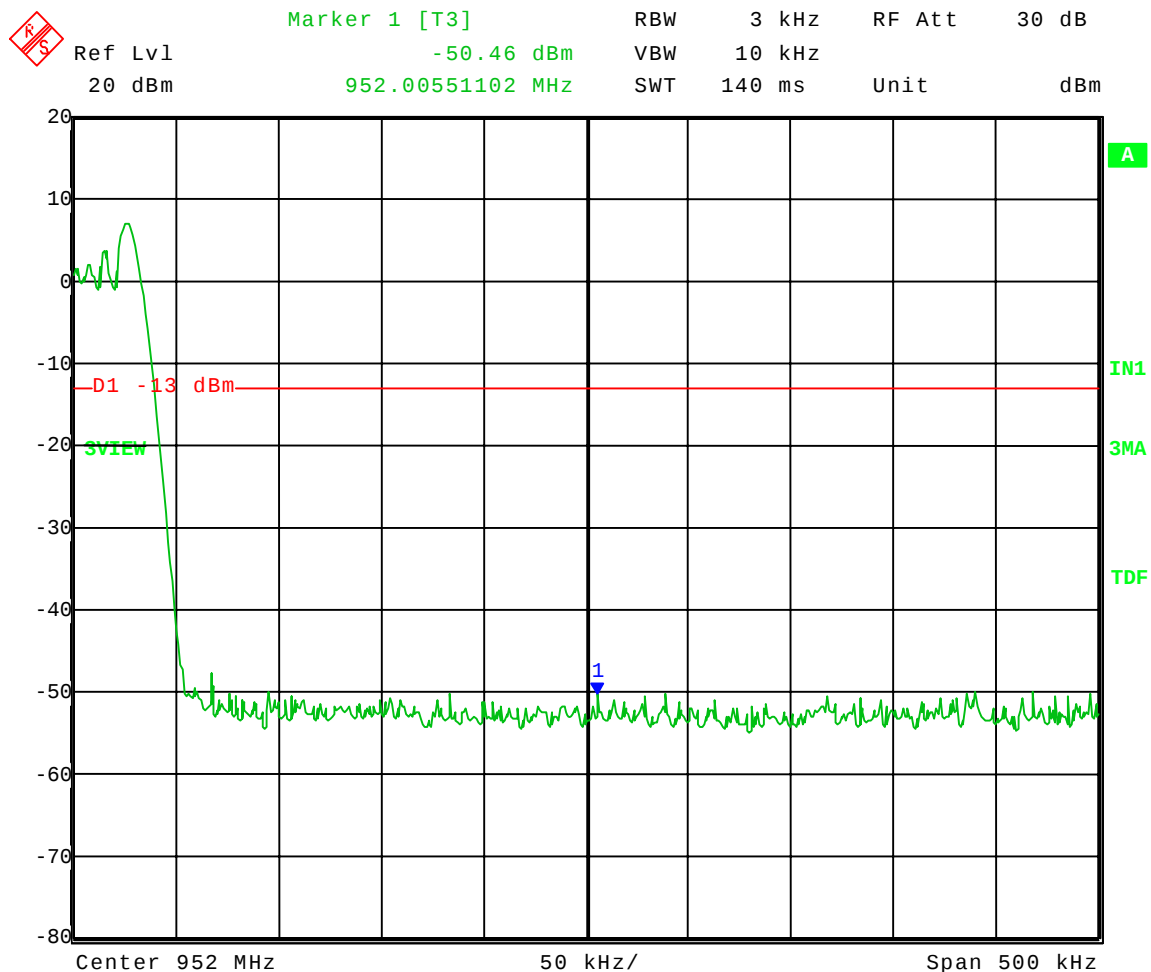
1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-18-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 951.75 MHz

Operating conditions: 120 V 50° C

Band-Edge Frequency = 952 MHz  
Band-Edge limit = -13 dBm



Date: 18.DEC.2007 13:48:34



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

## APPENDIX A

# DATA TAKEN FOR FREQUENCY TOLERANCE WHEN VARYING THE TEMPERATURE AND PRIMARY SUPPLY VOLTAGE PART 2.1055



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

DLS Electronic Systems, Inc.

Company: Shure, Inc.

Operator: Craig B

Date of test: 08-12-2008 and 08-14-2008

Limit = +/-9.4 kHz (+/- 10 ppm as stated by Shure, Inc.)

Frequency Stability FCC Part 74; FCC Part 2.1055

| Model | Nominal<br>Frequency (MHz) | Measured Frequency |             |            |             |            |             |            |             |            |             |
|-------|----------------------------|--------------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|
|       |                            | +50 deg. C         | Error (kHz) | +40 deg. C | Error (kHz) | +30 deg. C | Error (kHz) | +20 deg. C | Error (kHz) | +10 deg. C | Error (kHz) |
| P2T   | 944.200                    | 944.197771         | -2.229      | 944.198298 | -1.702      | 944.199976 | -0.024      | 944.200312 | 0.312       | 944.202154 | 2.154       |
| P2T   | 951.750                    | 951.747723         | -2.277      | 951.748154 | -1.846      | 951.750007 | 0.007       | 951.750024 | 0.024       | 951.752154 | 2.154       |
|       |                            |                    |             |            |             |            |             |            |             |            |             |

Frequency Stability FCC Part 74; FCC Part 2.1055

| Model | Nominal<br>Frequency (MHz) | Measured Frequency |             |            |             |            |             |            |             |  |  |
|-------|----------------------------|--------------------|-------------|------------|-------------|------------|-------------|------------|-------------|--|--|
|       |                            | 0 deg. C           | Error (kHz) | -10 deg. C | Error (kHz) | -20 deg. C | Error (kHz) | -30 deg. C | Error (kHz) |  |  |
| P2T   | 944.200                    | 944.202355         | 2.355       | 944.200952 | 0.952       | 944.198848 | -1.152      | 944.193637 | -6.363      |  |  |
| P2T   | 951.750                    | 951.752355         | 2.355       | 951.751353 | 1.353       | 951.748347 | -1.653      | 951.744138 | -5.862      |  |  |
|       |                            |                    |             |            |             |            |             |            |             |  |  |

Frequency Stability FCC Part 74; FCC Part 2.1055

| Model | Nominal<br>Frequency (MHz) | Measured Frequency |             |            |             |            |             |  |  |  |  |
|-------|----------------------------|--------------------|-------------|------------|-------------|------------|-------------|--|--|--|--|
|       |                            | 102 Volts          | Error (kHz) | 120 Volts  | Error (kHz) | 138 Volts  | Error (kHz) |  |  |  |  |
| P2T   | 944.200                    | 944.199880         | -0.120      | 944.200312 | 0.312       | 944.199976 | -0.024      |  |  |  |  |
| P2T   | 951.750                    | 951.749976         | -0.024      | 951.750024 | 0.024       | 951.749880 | -0.120      |  |  |  |  |
|       |                            |                    |             |            |             |            |             |  |  |  |  |



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

## APPENDIX A

### 11.0 FREQUENCY STABILITY PHOTOS TAKEN DURING TESTING





1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

## APPENDIX A

DATA AND GRAPH(S)

TAKEN FOR

INTERMODULATION

EIA /TIA-603-C:2004, SECTION 2.2.13

PART 2.1051



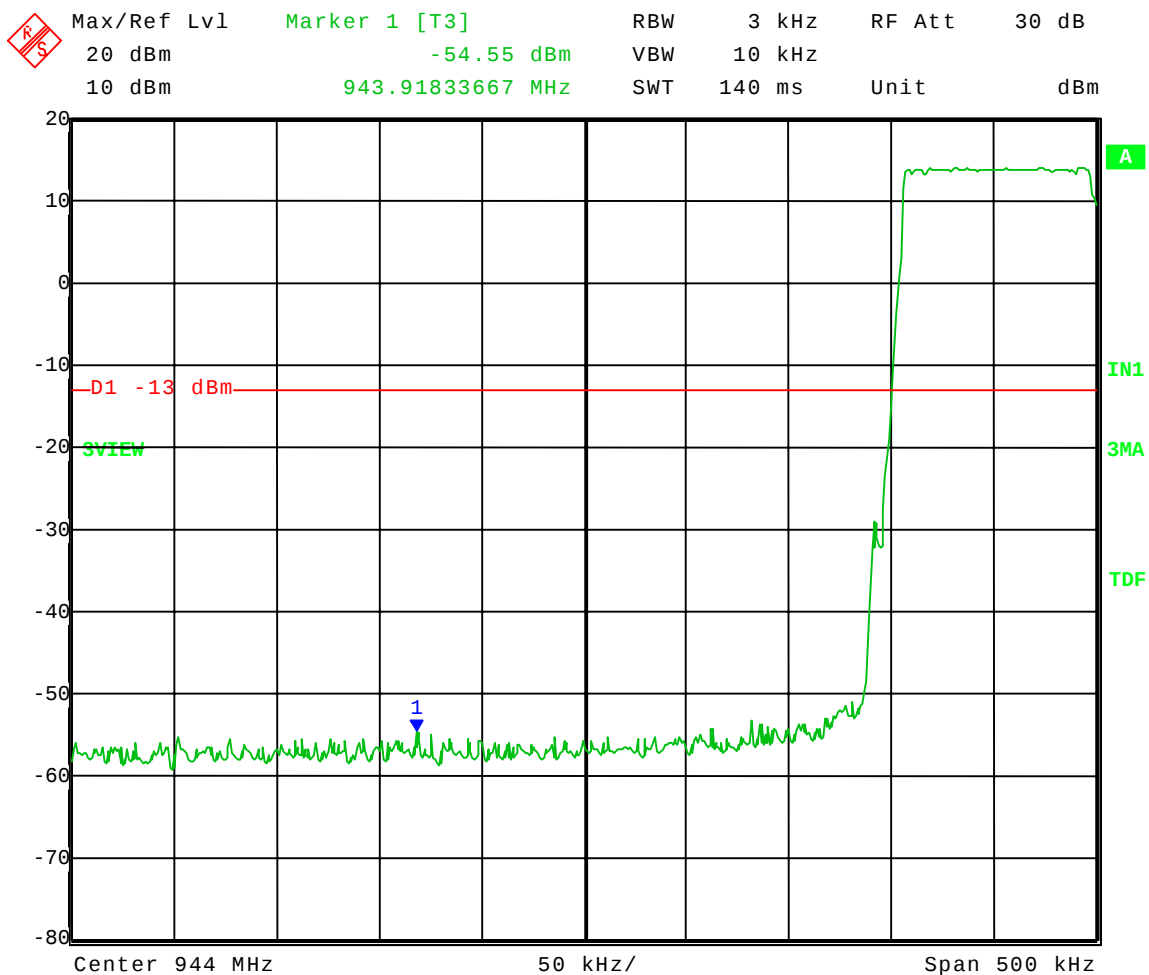
Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-19-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Intermodulation Products - Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 944.2 MHz  
2-Tone: 30 Hz and 50 Hz

Band-Edge Frequency = 944 MHz  
Band-Edge limit = -13 dBm



Date: 19.DEC.2007 11:38:54



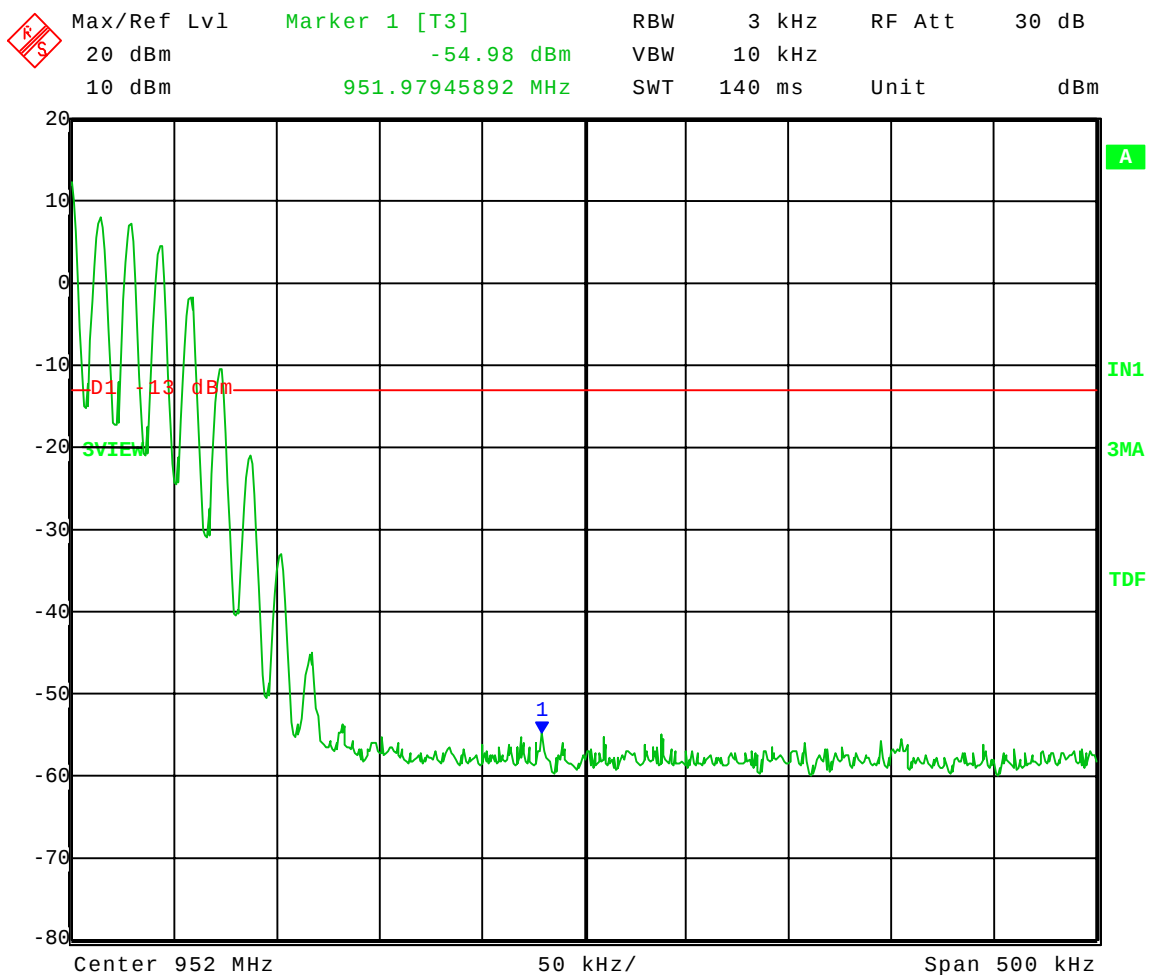
Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-19-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Intermodulation Products - Band-Edge Compliance - Conducted  
Rule part: FCC Part 74.861(d); FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 951.75 MHz  
2-Tone: 13 kHz and 15 kHz

Band-Edge Frequency = 952 MHz  
Band-Edge limit = -13 dBm



Date: 19.DEC.2007 11:42:53

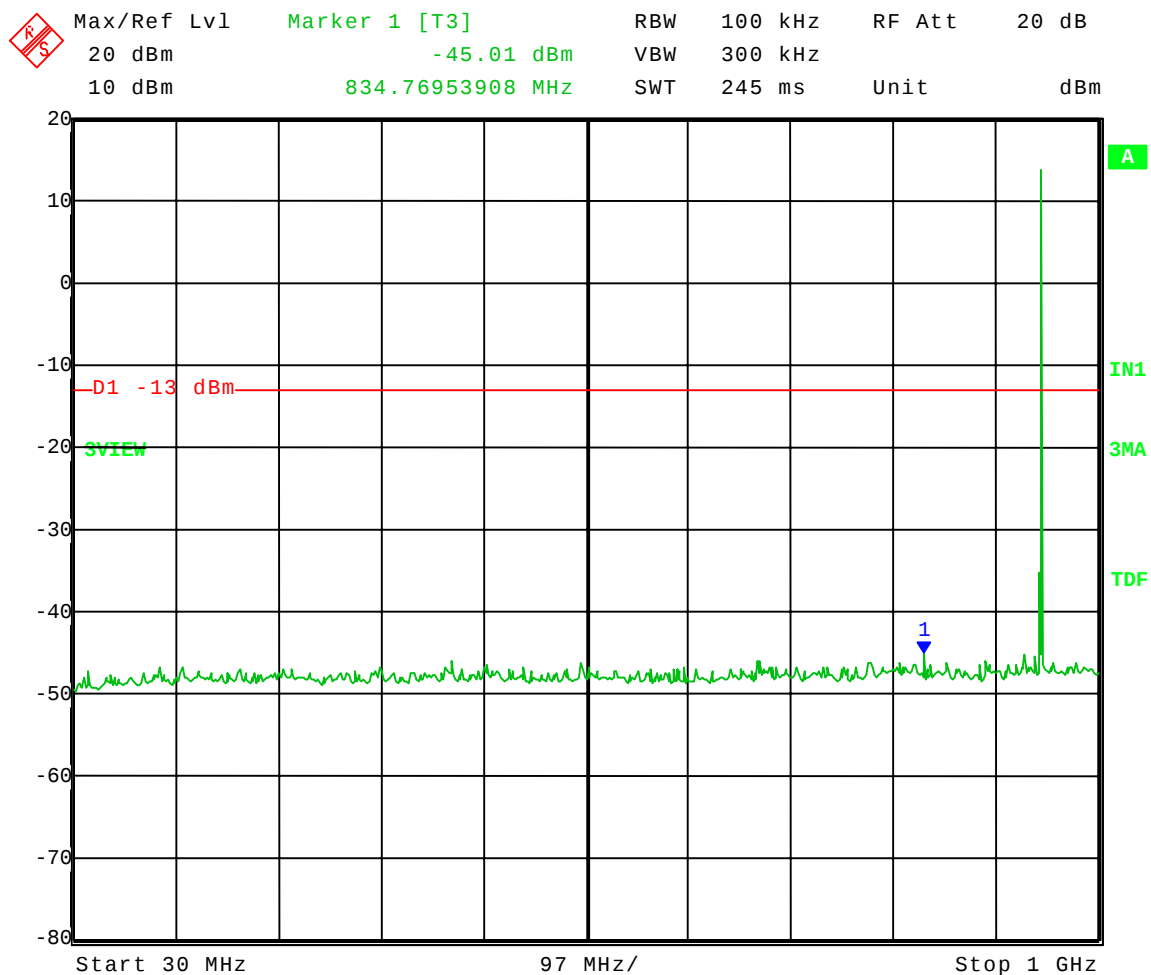


Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-19-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Intermodulation Products - Spurious Emissions - Conducted  
Rule part: FCC Part 74; FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 944.2 MHz  
2-Tone low side: 50 Hz and 90 Hz  
Frequency Range: 30 to 1000 MHz  
Limit = -13 dBm



Date: 19.DEC.2007 11:14:48

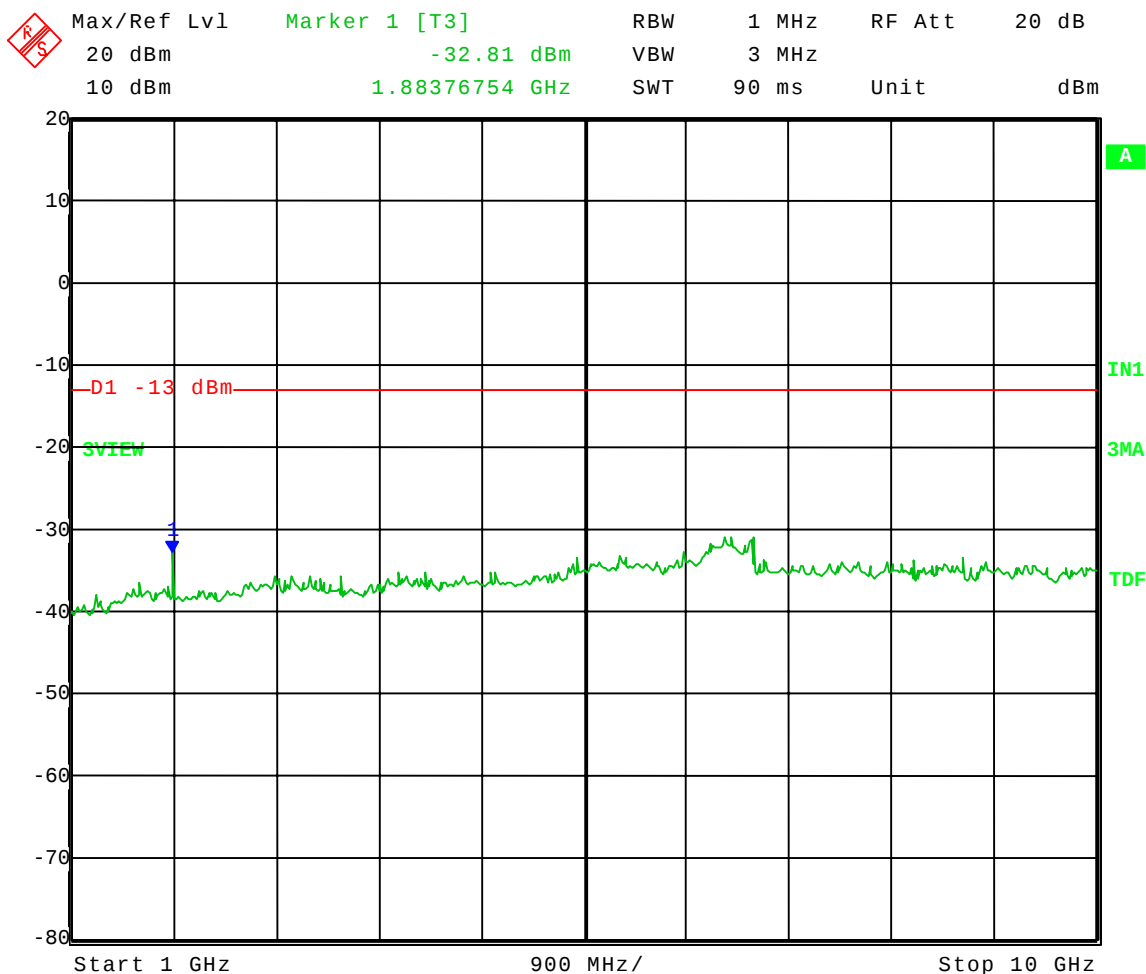


Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-19-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Intermodulation Products - Spurious Emissions - Conducted  
Rule part: FCC Part 74; FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 944.2 MHz  
2-Tone low side: 50 Hz and 90 Hz  
Frequency Range: 1 to 10 GHz  
Limit = -13 dBm



Date: 19.DEC.2007 11:16:40

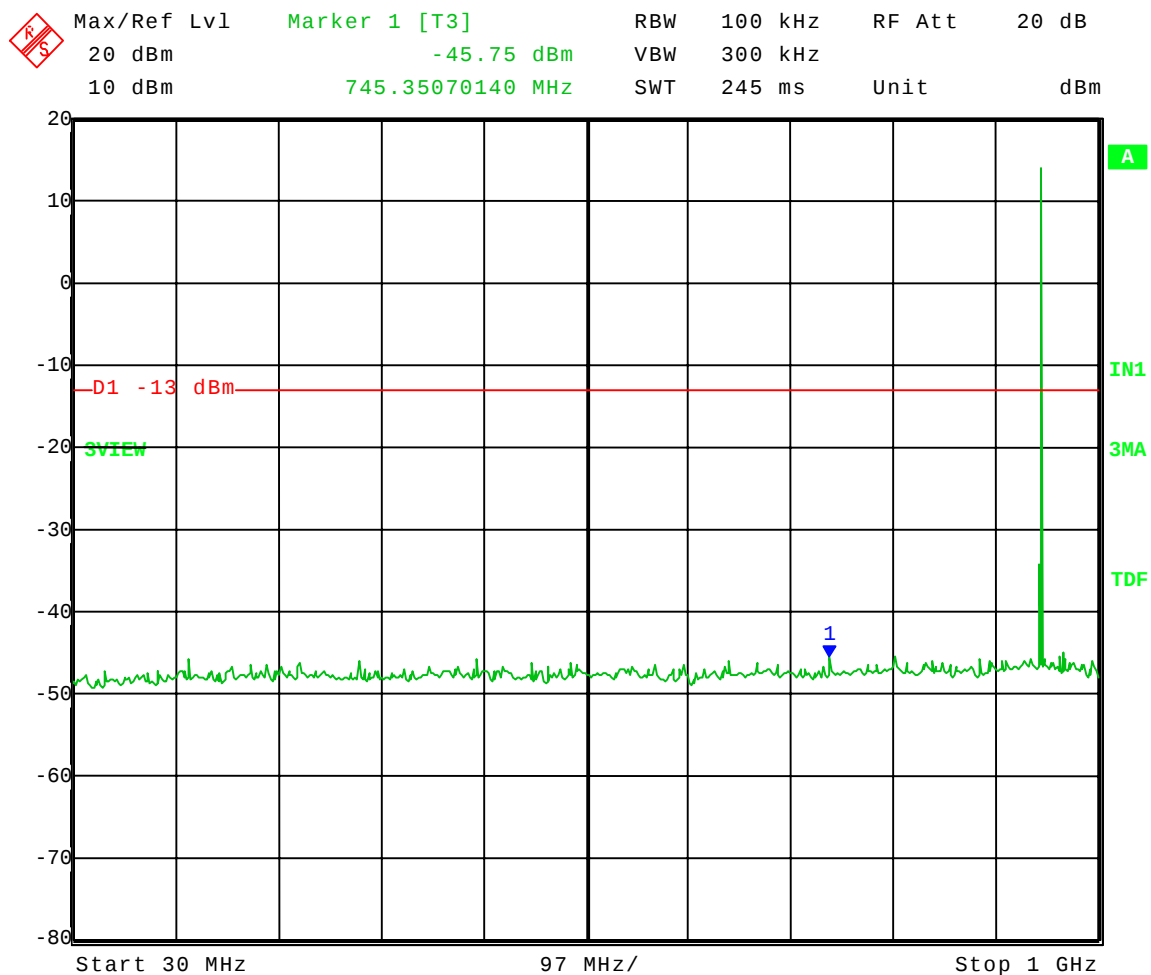


Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-19-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Intermodulation Products - Spurious Emissions - Conducted  
Rule part: FCC Part 74; FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 944.2 MHz  
2-Tone high side: 13 kHz and 15 kHz  
Frequency Range: 30 to 1000 MHz  
Limit = -13 dBm



Date: 19.DEC.2007 11:33:14

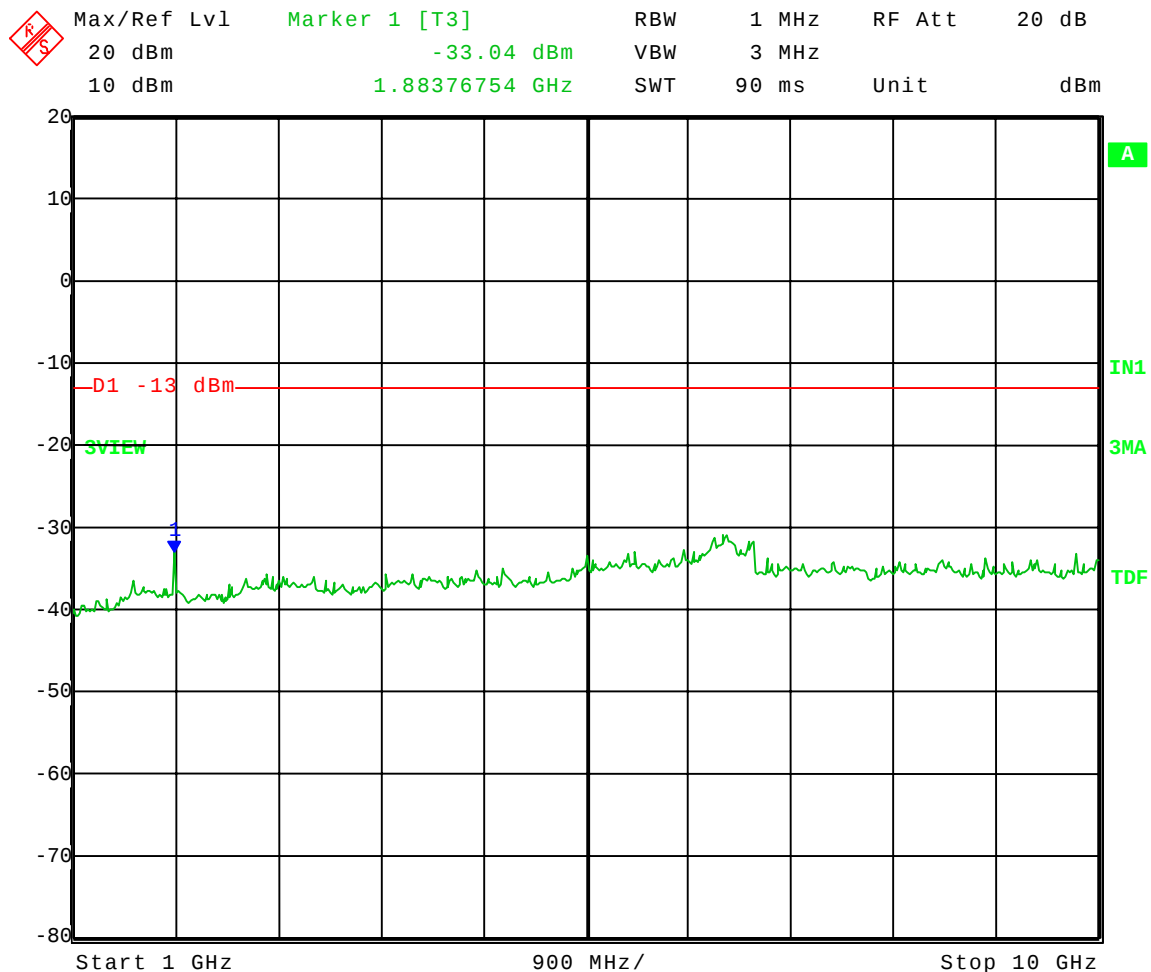


Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

Test Date: 12-19-2007  
Company: Shure, Inc.  
EUT: P2T-X1  
Test: Intermodulation Products - Spurious Emissions - Conducted  
Rule part: FCC Part 74; FCC Part 2.1051  
Operator: Craig B  
Comment: Channel: 944.2 MHz  
2-Tone high side: 13 kHz and 15 kHz  
Frequency Range: 1 to 10 GHz  
Limit = -13 dBm



Date: 19.DEC.2007 11:30:50



Company: Shure Inc.  
Model Tested: P2T-X1  
Report Number: 13927

1250 Peterson Dr., Wheeling, IL 60090

## APPENDIX A

### 13.0 INTERMODULATION PHOTOS TAKEN DURING TESTING

